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Ontario - Legislative Assembly

SESSIONAL PAPERS

(6)

VOL. XLIX.—PART VI.

THIRD SESSION

OF THE

FOURTEENTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO

SESSION 1917

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No. 5 Report of the Inspector of Division Courts for the year 1916. Presented to the Legislature, March 2nd, 1917. *Printed.*

No. 6 Report of the Inspector of Legal Offices for the year 1916. Presented to the Legislature, March 23rd, 1916. *Printed.*

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No. 16 Report of the Bureau of Labour for the year 1916. Presented to the Legislature, April 6th, 1917. *Not Printed.*

No. 17 Report of the Department of Education for the year 1916. Presented to the Legislature, April 6th, 1917. *Printed.*

No. 18 Report of the Board of Governors of the University of Toronto for the year 1916. Presented to the Legislature, February 20th, 1917. *Printed.*

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No. 27 Report upon the Neglected and Dependent Children of the Province for the year 1916. Presented to the Legislature, April 6th, 1917. *Not Printed.*

No. 28 Report upon the operation of the Liquor License Acts in the Province for the year 1916. Presented to the Legislature, March 2nd, 1917. *Printed.*

No. 29 Report of the Department of Agriculture for the year 1916. Presented to the Legislature, April 6th, 1917. *Printed.*

No. 30 Report of the Ontario Agricultural College and Experimental Farm for the year 1916. Presented to the Legislature, April 6th, 1917. *Printed.*

No. 31 Report of the Ontario Veterinary College for the year 1916. Presented to the Legislature, April 6th, 1917. *Printed.*

No. 32 Report of the Ontario Agricultural and Experimental Union for the year 1916. Presented to the Legislature, April 6th, 1917. *Printed.*

No. 33 Report of the Ontario Corn Growers' Association for the year 1916. Presented to the Legislature, April 6th, 1917. *Printed.*

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No. 36 Report of the Entomological Society of the Province for the year 1916. Presented to the Legislature, April 6th, 1917. *Printed.*

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No. 53 Report of the Provincial Auditor for the year 1916. Presented to the Legislature, February 22nd, 1917. *Printed.*

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No. 55 Report of the British Red Cross Fund for the year 1916. Presented to the Legislature, March 2nd, 1917. *Printed.*

No. 56 Report upon the Monteith Demonstration Farm for the year 1916 Presented to the Legislature, April 6th, 1917. *Printed.*

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No. 59 Statement as to distribution of the Revised and Sessional Statutes for the year 1916. Presented to the Legislature, February 20th, 1917. *Not printed.*

No. 60 Return to an Order of the House of April 19th, 1916, that there be laid before the House:—A Return shewing, 1. If the T. & N. O. Railway quoted any special rate not authorized by its tariff or has been a party to the quotation of a special rate from any point or points in Ontario or Western Canada. 2. If so, to what shipper or shippers has such rate been given. Presented to the Legislature, February 20th, 1917. Mr. *Munro. Not Printed.*

No. 61 Copies of Orders-in-Council made under the authority of the Department of Education Act, or of the Acts relating to Public Schools, Separate Schools or High Schools. Presented to the Legislature, February 20th, 1917. *Not Printed.*

No. 62 Report of the Nickel Commission. Presented to the Legislature, March 26th, 1917. *Printed.*

No. 63 Return of an Address to His Honour the Lieutenant-Governor of the 16th February, 1917, praying that he will cause to be laid before this House, a Return:—1. Shewing all correspondence

(including telegrams) since January 1st, 1916, passing between the Government of the Province of Ontario or any member, officer or official thereof, and the Government of the Dominion of Canada and any officer or official thereof in reference to the machine guns purchased out of the moneys of the Province of Ontario. 2. All correspondence since January 1st, 1916, passing between the Government of the Province of Ontario, or any member, officer or official thereof, and the Imperial Government, and any officer or official thereof, in reference to machine guns purchased out of the moneys of the Province of Ontario. Presented to the Legislature, March 1st, 1917. Mr. *Bowman. Not Printed.*

No. 64 Return to an Order of the House of the 26th February, 1917, for a Return shewing:—1. How many charters or licenses have been issued to racing associations operating in Ontario since the year 1912. 2. What are the names of the racing associations or companies and the dates of the issue of the licenses or charters respectively. Presented to the Legislature, March 1st, 1917. Mr. *Carter. Printed.*

No. 65 Return to an Address to His Honour the Lieutenant-Governor of the 11th April, 1916, praying that he will cause to be laid before this House a Return shewing:—1. Copies of all letters or telegrams, since the 1st January, 1915, which have passed between the Government or any official or agent thereof, and the International Nickel Company or the Canadian Copper Company or any officers or officials thereof, in reference to the damages done to the property of the farmers and others interested in the lands adjacent to the plant of the Canadian Copper Company. 2. Of all letters and telegrams which have passed between the Government, or any officer or official thereof—and particularly the Departments of Lands, Forests and Mines and of Agriculture—and Mr. Chas. McCrea, M.P.P., of Sudbury, in reference to the matters aforesaid or the operations of the International Nickel Company or the Canadian Copper Company, and the damage being done to the property in the vicinity of the operations of the said companies; and particularly the correspondence between either of the Departments and Mr. McCrea and Mr. Ponton and Mr. Jarvis, Valuators for the Canadian Copper Company. 3. Of all Orders in Council withdrawing lands from sale for agricultural purposes, at the instance or suggestion of the Canadian Copper Company. Presented to the Legislature, March 2nd, 1917. Mr. *Carter, Printed.*

No. 66 Return to an Order of the House of the 19th February, 1917 for a Return shewing how many patients were regularly cared for in the Whitby Asylum during the year 1916. Presented to the Legislature, March 2nd, 1917. Mr. *Wigle. Printed.*

No. 67 Return to an Order of the House of the 23rd February, 1917, for a Return of copies, 1. Of the pay-rolls of the Industrial Department of the Reformatory for the Porvince of Ontario, commencing November 1st, 1915, and ending October 31st, 1916, specifying the nature of the services rendered by those whose names appear in the Return. 2. Of the monthly payments by the Industrial Department of the Reformatory for the Province of Ontario to persons whose names do not appear upon the monthly pay-roll of the Industrial Department, specifying the nature of the services rendered by those whose names appear in the Return. Presented to the Legislature, March 2nd, 1917. Mr. *Bowman*. *Not Printed.*

No. 68 Return to an Order of the House of the 3rd April, 1916, for a Return shewing: 1. The number of acres occupied by *bona fide* settlers on the lands purchased from the Government by Willis K. Jackson *et al.* under agreement bearing date the 14th day of June, 1912, particularizing the number of acres occupied each year since the date of the said agreement. 2. The number of settlers occupying such lands since the date of such agreement and the number respectively occupying the same for each year since the date of said agreement and the number of acres occupied by each settler. 3. The number of settlers who have lived up to the requirements of The Free Grant and Homestead Act and the regulations thereunder, and the number in default. 4. The number of farms required to be cleared by the Minister under Clause 4 of said agreement, and the actual number of such farms cleared, the amount of work performed, and the number and kind of buildings erected in accordance with the request of said Minister. 5. The number and extent of roads, bridges and other improvements, designating the nature of such improvements, required by the Minister to be done under Clause 5 of said agreement and the number and extent of such roads, bridges and other improvements completed in accordance with such request. 6. The number of schools and school buildings erected under Clause 6 of said agreement, and whether same are established and erected to the satisfaction of the Minister, also the location of such schools, particularizing those which are not satisfactory to the Minister and the reason for such dissatisfaction. 7. The amount of work required to be performed under Clause 7 of said agreement that has actually been performed, particularizing the nature and cost of such work, and the date each work was commenced and completed. 8. The number of acres cut over by the purchaser under Clause 8 of said agreement, and whether same cleared in accordance with the terms of said clause and to the satisfaction of the Minister; and whether the terms of said clause as to leaving 20 acres of wood for each farm have been complied with, and the kind of wood so left. 9. Whether all the timber cut by the purchaser has been manufactured in the townships of Kendry and Haggart,

and if not, the amount not so manufactured and the amount of timber disposed of outside of such townships, and to whom the same was sold. 10. The amount of timber that has been purchased from the settlers by the purchaser, and upon what terms were such purchases made; and how much and at what rate were the settlers paid for cutting and removing timber; and what was the rate charged to the settler for the use of the purchaser's teams. 11. The number and date of sales that have been made by the purchaser to settlers and the terms of such sales and copies of all agreements between such settlers and purchasers and as to whether the same have been approved of by the Minister. 12. The number of patents issued to settlers under Clause 13 of said agreement. 13. The extent of the lands upon which patents have been issued to the purchaser under Clause 14 of said agreement, and the nature and cost of the buildings built on same for which such patents granted. 14. All correspondence between the Government or any officer or official thereof and the purchaser or any of them, or any officer or official of such purchaser, and between the Government or any officer or official thereof and any settlers, relating to the whole or any part of the subject matter of the said agreement. Presetned to the Legislature, March 6th, 1917. Mr. *Lang. Not Printed.*

No. 69 Return to an Order of the House of the 16th February, 1917, for a Return shewing:—1. All statements furnished by the Canada Copper Company, International Nickel Company, Mond Nickel Company, and any other company producing nickel, under section 8 of The Mining Act, respecting taxation since the 1st of January, A.D. 1915. 2. All reports from any Government Mine Assessor, made under the provisions of The Mining Act, in respect to the mining operations of the Canada Copper Company, the International Nickel Company or the Mond Nickel Company, particularly with reference to the taxes to be paid by the said companies, or any of them, under The Mining Tax Act. 3. All correspondence since the 1st day of January, 1915, between the Minister of Lands, Forests and Mines, or the Provincial Treasurer, or any officer or official of the Government, and the Canada Copper Company, the International Nickel Company, the Mond Nickel Company, and any other companies producing nickel, or any officer or solicitor for or on behalf of the said companies, or any of them, with reference to the amount of taxes or royalties paid or to be paid by the said companies or any of them, to the Provincial Treasurer of the Province, in respect of the ore mined or the mining operations carried on by them in the Province of Ontario. Presented to the Legislature, March 16th, 1917. Mr. *Carter. Not Printed.*

No. 70 Return to an Order of the House of the 9th March, 1917, for a Return shewing:—1. The number, kind and cost of buildings comprised in the Burwash Prison Farm property. 2. What is the number of acres of land belonging to or included in the Bur-

wash Prison Farm property, and of such land, how many acres are under cultivation, and how many acres are used for the purpose of pasture. 3. How many prisoners are there at Burwash Prison Farm. 4. What is the number of employees at the Burwash Prison Farm, and what is the amount of salary paid to each employee. 5. Were cattle or other animals shipped from the Burwash Prison Farm in the year 1916, and if so, what was the number so shipped, the total value of such shipments and the amount paid as freight charges thereon. 6. Were cattle or other animals brought to the Burwash Prison Farm from other places in the year 1916, and if so, what was the number so brought, and what were the names of the places from which said cattle or other animals were brought. Presented to the Legislature, March 16th, 1917. Mr. *Mageau.* *Printed.*

No. 71 Return to an Order of the House of the 16th February, 1917, for a Return:—1. Shewing the names of all the Townsites established by the T. & N. O. Ry. Commission. 2. Shewing all the townsite lands sold by the T. & N. O. Ry. Commission on or after July 29, 1916, the towns in which they were situated, and the amounts received for each. Presented to the Legislature, March 20th, 1917. Mr. *Bowman.* *Not Printed.*

No. 72 Copies of contracts with The Kinleith Paper Company, Limited, St. Catharines, Ontario; The Georgetown Coated Paper Mills, Limited, Georgetown; The Provincial Paper Mills Company, Limited, Toronto; authorized by Order in Council dated February 20th, 1917. Presented to the Legislature, March 21st, 1917. *Printed.*

No. 73 Return to an Order of the House of the 19th February, 1917, for a Return shewing if the Canadian Northern Railway Company applied to the Minister of Lands, Forests and Mines to designate the lands or any part of the lands to be granted to the said railway as provided in section 3, 9 Edw. VII., chap. 71. 2. Has the Minister of Lands, Forests and Mines designated any such lands or any part of the same. 3. If such lands or any part of the same have been so designated, what is the total acreage so designated, and of what townships or part of townships does the same consist. 4. Have the said lands or any part of the same been surveyed. 5. If the said lands have not been so designated, why have they not been designated. Presented to the Legislature, March 21st, 1917. Mr. *Davidson.* *Printed.*

No. 74 Return to an Order of the House of the 23rd February, 1917, for a Return shewing:—1. What amounts have been paid and upon what dates since January 1st, 1916, to the firm of Gunn, Richards and Company, Production Engineers and Public Accountants of 43 Wall Street, 43 Exchange Place, New York, or to any one acting for them, or on their behalf, on account of any

Department of the Government. 2. What amounts, if any, are still owing to the said firm or any one acting for them or on their behalf. 3. What were the services rendered in respect to which such payments were made or liability incurred. 4. By what authority was the employment of the said firm authorized. Presented to the Legislature, March 21st, 1917. Mr. *Richardson. Not Printed.*

No. 75 Return to an Order of the House of the 19th February, 1917, for a Return shewing:—1. The total capital expenditure to the end of the fiscal year for all purposes in respect to the Guelph Prison Farm. 2. Any further capital expenditures contemplated, and if so, to what amount. 3. How many prisoners, on the average, have been accommodated at the Guelph Prison Farm during the year 1916. 4. How many prisoners are now at the Guelph Prison Farm for offences against the criminal law. 5. What was the average number of prisoners at the Guelph Prison Farm during the year 1916 for offences against the criminal law. Presented to the Legislature, March 28th, 1917. Mr. *Ferguson (Kent.) Printed.*

No. 76 Return to an Order of the House of the 28th March, 1917, for a Return shewing:—1. What was the total cost of the knitting plant installed at the Mercer Reformatory, Toronto. 2. From whom was such knitting plant purchased and what was the date of purchase. 3. When was the said knitting plant installed. 4. What amount was paid to operatives up to the 1st of March, 1917, for operating the said plant. 5. What is the value of the goods produced from the knitting plant. 6. Have the goods produced by the said plant been sold, and if so, to whom. Presented to the Legislature, March 29th, 1917. Mr. *Ferguson (Kent.) Not Printed.*

No. 77 Return to an Address to His Honour the Lieutenant-Governor of the 19th February, 1917, praying that he would cause to be laid before this House a Return:—1. Of copies of all correspondence passing between the Government of this Province, or any member, officer or official thereof, and the Government of the Dominion of Canada, or any officer or official thereof, in reference to the care of Returned Soldiers. 2. Of all correspondence passing between the Government of this Province, or any member, officer or official thereof, and the Government of the Dominion of Canada, or any officer or official thereof, in reference to the establishment of Convalescent Homes for the care of Returned Soldiers. 3. Of all correspondence passing between the Government of this Province, or any member, officer or official thereof, and the Government of the Dominion of Canada, or any officer or official thereof, in reference to the relations between the Soldiers' Aid Commission and the Military Hospitals Commission of the Army Medical Service Corps. Presented to the Legislature, April 2nd, 1917. Mr. *Rowell. Not Printed.*

No. 78 Return to an Order of the House of the 21st March, 1917, for a Return of copies: 1. Of all correspondence and documents at any time passing between the Director of Industries, Ontario Reformatory, and the Assistant Provincial Secretary, referring to Alexander McPherson, foreman, Ontario Reformatory Industries, and Fred. W. French, Assistant Director of Ontario Reformatory Industries, or either of them, or relating to any matters arising between the said Alexander McPherson and Fred. W. French. Presented to the Legislature, April 2nd, 1917. Mr. *Richardson*. *Not Printed.*

No. 79 Copies of all Orders-in-Council made under the authority of the Department of Education Act or of the Acts relating to Public Schools, Separate Schools or High Schools, passed since the opening of the present Session of the Legislative Assembly. (*See No.* 61.) Presented to the Legislature, April 2nd, 1917. *Printed.*

No. 80 Return to an Order of the House of the 30th March, 1917, for a Return shewing: 1. What has been the cost of the Ontario Nickel Commission since the 1st day of February, 1917: (*a*) For salaries or payments by way of remuneration or honorarium to each member of the Commission respectively; (*b*) For travelling expenses of each member of the Commission respectively; (*c*) For allowance in lieu of travelling expenses to each member of the Commission respectively; (*d*) For other purposes, specifying such purposes and amounts. 2. What honorarium, remuneration or salary is payable or to be paid to the members of the Commission other than G. T. Holloway. 3. Is the Chairman, G. T. Holloway, still in the Government employ at $20,000 *per* year and $10.00 *per* day in lieu of travelling expenses, and if so when will the obligation of the Government cease. 4. Are the travelling expenses of the said G. T. Holloway from Toronto to Great Britain to be paid by the Government in addition to the allowance made to him. 5. What were the services rendered by each of the following parties in respect of which payments were made to them for salary as shown in the Return of the 16th February, 1916, respectively: Professor George A. Guess, salary, $1,250; F. Clithero, salary, $388.54; G. W. Dixon, salary, $359.03; A. L. Clark, salary, $600.00; R. N. Dickson, salary, $485.00; A. Stanfield, salary, $200.00; E. M. Tozer, salary, $306.60; E. A. Wilson, salary, $210.73. Presented to the Legislature, April 4th, 1917. Mr. *Dewart*. *Not Printed.*

No. 81 Return to an Order of the House of the 19th March, 1917, for a Return of copies of all correspondence between the Government of Ontario or any Member, officer or official thereof, and the Devonshire Race Track Company or any member, officer or official thereof, and in particular the correspondence between J. T. White, Esq., Solicitor to the Department of the Provincial Treasurer, and Hon. Dr. Reaume. Presented to the Legislature, April 4th, 1917. Mr. *Wigle*. *Not Printed.*

No. 82 Return to an Order of the House of the 28th March, 1917, for a Return of:—1. Copies of: (1) Charter of the Gore Bay Riding and Driving Association. (2) Supplementary Letters Patent, dated 17th November, 1915, increasing capital stock to $25,000, and changing name to "Northern Riding and Driving Association." (3) Supplementary Letters Patent, dated 12th February, 1916, increasing capital stock to $200,000. 2. Copies of all annual returns made by the said company. 3. Copies of all correspondence, and documents filed with the Government on the application for the issue of said Supplementary Letters Patent. 4. Copies of application for license to the Provincial Treasurer, and all correspondence and communications in connection with the issue of said license to hold a race meeting at Windsor. Presented to the Legislature, April 6th, 1917. Mr. *Wigle*. *Not Printed.*

No. 83 Report of the Horticultural Experiment Station, Vineland Station, Ontario, 1906-1915. Presented to the Legislature, April 6th, 1917. *Printed.*

No. 84 Report of the Soldiers' Aid Commission of Ontario, 1916. Presented to the Legislature, April 6th, 1917. *Not Printed.*

No. 85 Return to an Order of the House of the 12th March, 1917, for a Return shewing what was the number of prisoners in all gaols, reformatories and prisons in the Province of Ontario, on the thirtieth day of September, 1916. Presented to the Legislature, April 6th, 1917. Mr. *Parliament*. *Not Printed.*

No. 86 Return to an Order of the House of the 26th March, 1917, for a Return shewing:—1. What was the total number of members of the Inside Civil Service of the Government of the Province of Ontario and the total number in each department thereof on the 31st day of July, 1914, the 31st day of July, 1916, and the 28th day of February, 1917, respectively. Presented to the Legislature, April 6th, 1917. Mr. *Elliott*. *Not Printed.*

No. 87 Return to an Order of the House of the 16th March, 1917, for a Return shewing:—1. What tenders were received for each and every of the lots advertised for sale by George W. Lee, Commissioner of the Temiskaming and Northern Ontario Railway in the "North Bay Times" on Thursday, October 12th, 1916. 2. Which of the said lots have been sold by the said George W. Lee, the Temiskaming and Northern Ontario Railway Commission or any officer or official thereof. 3. What were the prices and terms at and upon which each and every of the said lots were sold by the said George W. Lee, the said Commission or any officer or official thereof. 4. Which of the said lots sold by the said George W. Lee, the said Commission, or any officer or official thereof, within the municipalities of Porquis Junc-

tion, Matheson, Cochrane, and Englehart, or what proportion of each and every lot so sold lies within the municipalities. Presented to the Legislature, April 6th, 1917. Mr. *Mageau*. *Not Printed.*

No. 88 Return to an Order of the House of the 21st March, 1917, for a Return of copies:—1. Of all reports for the year ending October 31st, 1916, of the superintendents of each and all the asylums, government prisons and reformatories in Ontario. 2. Of letters between Assistant Provincial Secretary and Fred Hill, relating to the dismissal of the said Fred Hill from the staff of the Ontario Reformatory at Guelph. Presented to the Legislature, April 6th, 1917. Mr. *Grieve*. *Not Printed.*

No. 89 Return to an Order of the House of the 16th February, 1917, for a Return shewing:—1. What amount has actually been paid since January 1st, 1916, for war purposes, by the Government, out of the proceeds of the Provincial War Tax. 2. For what particular purposes have such payments been made and what are the date of such payments. Presented to the Legislature, April 6th, 1917. Mr. *Bowman*. *Not Printed.*

FORTY-SEVENTH ANNUAL REPORT

OF THE

INSPECTOR OF PRISONS AND PUBLIC CHARITIES

UPON THE

Hospitals and Charitable Institutions

OF THE

PROVINCE OF ONTARIO

BEING FOR THE YEAR ENDING 30th SEPTEMBER

1916

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1917

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PARLIAMENT BUILDINGS,
TORONTO, DEC. 4TH, 1916.

To His Honour SIR JOHN STRATHEARN HENDRIE, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I beg to submit herewith the Forty-seventh Annual Report upon the Hospitals and Charitable Institutions of Ontario, being for the official year ending September 30th, 1916.

I have the honour to be,

Your Honour's obedient servant,

W. D. MCPHERSON,
Provincial Secretary.

Office of the

Inspector of Prisons and Public Charities, Ontario.

Parliament Buildings, Toronto, Nov. 14th, 1916.

Sir,—I have the honour to transmit herewith, to be presented to His Honour the Lieutenant-Governor, the Forty-seventh Annual Report upon the Hospitals and Charitable Institutions, etc., for the official year ending September 30th, 1916.

I have the honour to be, Sir,

Your obedient servant,

W. W. Dunlop,

Inspector.

The Honourable W. D. McPherson, K.C., M.P.P.,
Secretary of the Province of Ontario,
Toronto.

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Hospitals and Charitable Institutions

In presenting the forty-seventh annual report on the Hospitals and Charitable Institutions for the year ending September 30th, 1916, I beg to state that there are at present in Ontario:—

93 Public Hospitals, including 12 Sanatoria for Consumptives.
46 Private Hospitals.
39 Refuges.
32 Orphanages.
3 Homes for Incurables.
2 Convalescent Homes.
31 County Houses of Refuge.

These have, as far as possible, received official visits of inspection during the year, and those entitled to Government aid in accordance with the Statute have shared in the grants voted by the Legislature for Hospitals and Charities.

THE HOSPITALS.

Number of patients in the hospitals, October 1st, 1915	5,205
Number of patients during the year	89,386
Number of births in the hospitals during the year	6,631
Total number under treatment during the year	101,222

The above figures do not include those who received medicine and treatment as outdoor patients.

Number of deaths during the year	5,541
Percentage of deaths to number under treatment	5.47
Total number of days' stay in the hospitals	1,878,436
Provincial grant to hospitals for the past year	$338,342 80
Amount received from all sources during the year	3,220,861 01
Subscriptions, donations, etc., during the year	339,702 09
Total expenditure for hospitals (including capital account, $465,136.06) during the year	3,632,759 51
Average cost for each patient per day	1.71
Percentage of Provincial grant to total maintenance expenditure	9.7
Number of patients in the 12 Sanatoria for Consumptives during the past year	2,644
Number of patients cared for in the Public Hospitals during the year	101,222
Total expenditure for maintenance and equipment during the past year	$3,221,116 07

THE GREAT WAR.

The great majority of those who are engaged in hospital work, whether as staff officials or voluntary workers, have remembered the paramount claims of the Empire, and many have the proud consciousness of "doing their bit."

Every hospital in Ontario and many of our charitable institutions are represented at the front.

In many cases members of the Boards of Management, officials and staff, inmates or former inmates, are on active service.

Soldiers who were ill have been admitted to the hospitals whenever it was necessary, and some of our hospitals have thus cared for hundreds of soldiers for longer or shorter periods of time.

Many hospitals have enlarged the medical, surgical and nursing staffs to meet this call.

Other hospitals have, free of all charge, at the request of the district recruiting officers, received, maintained and cured numbers of recruits, who needed some comparatively slight operation to secure their acceptance on the strength of a regiment, and these recruits were thus enabled to enlist.

In addition there are few hospitals in Ontario which have not sent one or more representatives to the Army Medical Service at home or overseas.

THE ONTARIO MILITARY HOSPITAL.

The Ontario Military Hospital Staff of Medical Officers and Nursing Sisters received orders to mobilize at the Parliament Buildings, Toronto, on January 31st, 1916, and left Toronto for Orpington, Kent, England, by special train on the night of March 29th, 1916. The history of this hospital, which, with its complete equipment, was the gift of the Government and the people of the Province of Ontario, will no doubt be recorded and published in future, but it seems fitting that an event so full of interest to us as the mobilizing and departure for active service of the hospital staff should be mentioned in the present report.

PROGRESS.

In spite of all the difficulties of war time, the high cost of living, and the almost prohibitive cost of many medical and hospital necessaries, the work of most of our hospitals has actually increased during the year.

Some hospitals report a number of patients, particularly outdoor patients, greatly in excess of last year's number.

NEW HOSPITALS.

The first unit of the New City Hospital, Hamilton, has been completed, and is now being equipped. It is beautifully situated on the mountain, and will accommodate about one hundred patients. The cost was $200,000. The Nurses' Home, to cost $65,000, is now under construction.

The extensive reconstruction which has been carried on at the Hamilton City Hospital during the last two years, at a cost of $300,000. is now practically completed. Fire-proof corridors, a new kitchen building and large cement balconies, thoroughly screened, have been provided. The outdoor department, the laboratories, the laundry and the power house, have all been greatly improved. A new refrigerating system, a new X-ray department, new roadways, and a new lighting system, as well as new service and utility rooms in all the wards, have added very much to the equipment of the hospital, the comfort of the patients, and the general efficiency and satisfaction of the work.

Another new hospital has been built in Ontario this year. In June, 1916, the Port Hope Hospital opened a new building of 25 beds with good modern equipment, including an electric elevator, silent nurse call system, house telephones, and an incinerator for garbage.

In addition a tent was erected, which enabled the hospital to care for 156 soldiers.

The old hospital is now being remodelled as a Nurses' Home.

NEW WINGS.

St. Joseph's Hospital, Hamilton, has completed a very fine new wing, which is fire-proof and planned in a modern and satisfactory way. Two sun-rooms on each floor, as well as a large airing balcony, give outdoor space for seventy-five per cent. of the patients.

On the first floor provision is made for laboratory and X-ray work, class and lecture rooms, dining rooms for staff and nurses, kitchens and storage. The kitchen has many modern improvements, and is remarkably well planned and equipped.

The upper floor is used for the operating suite. The sterilizers and operating table are new and of the latest and best type.

The system of lighting is indirect. The ventilation is the fan system. The heating plant is in a separate building, double boilers providing steam for the entire hospital.

An effort has been made to minimize the noise. The staircases are shut off from the corridors. The elevator is in the nurses' alcove; battleship linoleum is used on the floors, and the signal system is the silent call.

The Ottawa General Hospital has erected a new wing at a cost of about $81,000. It is a three-storey, stone, fire-proof building, provided with modern equipment. The outdoor department has been well equipped and an X-ray department has been opened.

At the Alexandra Hospital, Ingersoll, a new wing is now in course of erection, providing two storeys and basement. This will be used primarily as a children's wing, but will include also an operating room, and an elevator which will serve both the new wing and the old building.

The entire building will be steam heated.

The money for the new wing was a bequest from Dr. Carroll, of Ingersoll.

A new wing is also being added to Bowmanville General Hospital, comprising a sterilizing room, doctor's room, maternity ward, and two private wards.

RECONSTRUCTION.

Many hospitals have expended large sums for general repairs and partial reconstruction during the year. Among these may be mentioned St. Joseph's Hospital, Kenora, which has spent $5,000 on repairs and alterations. Cornwall General Hospital has expended about $2,000, and St. Joseph's Hospital, Guelph, about $1,000 in the same way. Woodstock General Hospital, St. Joseph's Hospital, Chatham, Stratford General Hospital, Hotel Dieu Hospital, Windsor, Collingwood General and Marine Hospital, and St. Joseph's Hospital, Sudbury, have also made important alterations and repairs.

The reconstruction at Brantford General Hospital, by which the third floor was fitted up as an operating suite, has been completed. The operating rooms have Tennessee marble floors and are newly equipped throughout. The main hospital has been put in thorough repair, modernized and redecorated, and five new bathrooms and three new private wards have been added, and the exterior has been greatly improved.

OPERATING ROOMS.

An operating suite has been constructed in St. John's Hospital, Toronto. The rooms are all floored with terazzo and fully equipped.

The Midland General and Marine Hospital has provided a cement floor for the operating room and installed a new sterilizer.

Collingwood General and Marine Hospital and Strathroy Hospital and several other hospitals have also improved the operating rooms.

MATERNITY WARDS.

The Orillia General Hospital has provided for a maternity ward by renting a house adjoining the Nurses' Home, and Collingwood General and Marine Hospital has also improved the maternity department.

A number of other hospitals have been requested, in accordance with the official regulations, to give this important department proper housing and equipment.

PRIVATE WARDS AND CHILDREN'S WARDS.

The private wards have been improved in Victoria Hospital, Renfrew; Bruce County General Hospital, Walkerton, and the Royal Jubilee Hospital, Kenora.

St. Joseph's Hospital, London, reports that a children's ward has been opened with accommodation for ten patients.

In the General Protestant Hospital, Ottawa, the children's ward has been partly divided into cubicles.

THE HOSPITAL FOR SICK CHILDREN.

The Hospital for Sick Children, Toronto, which was established in 1875, has now completed forty-one years of service

During these years there were 300,524 patients, 29,153 in-patients and 271,371 out-patients, of whom 141,293 were girls and 159,291 boys.

In 1875 there were 44 in-patients and 67 out-patients; in 1916 in-patients numbered 3,045 and out-patients 39,603. 1875, cots, 6; 1916, cots, 250. 1875, nurse, 1; 1916, nurses, 100; 1875, receipts, $2,258.03 and expenditure $2,256.03. 1916, receipts, $149,818.09, and expenditure, $171,056.99.

Last year 592 patients were admitted from 242 places outside Toronto. From the County of York there were 193 patients The cost per patient per day is $2.35.

A new department opened in 1916 is the whooping cough clinic in the out-patient department. 1,306 patients have already attended. Each patient attending this clinic must wear a red ribbon round his or her arm bearing the words "whooping cough" to secure quarantine. The serum treatment has already been followed with good results.

The orthopedic service is one of the best and most helpful departments in this hospital. Of 3,045 in-patients last year 271 were treated for deformities as follows: 54 for club feet; 54 for bow-legs; 2 for knock-knees; 28 for Pott's disease of the spine; 27 for dislocations; 36 for tuberculous disease of the knee, hip, ankle, wrist and elbow; 80 for infantile paralysis; 12 miscellaneous. Of the 39,603 out-patients 1,746 were orthopedic cases.

It is estimated that in the last thirty years, out of about 2,000 cases of club feet and bow-legs, over 1,800 were sent home with perfect correction.

THE INFANTS' DEPARTMENT.

The opening of the new wing on Dominion Day, 1914, marked a great advance in the history of this hospital.

The greatest work carried on in the new wing is the work of the infants' department, which occupies one floor of the wing, with accommodation for 65 children under two years of age.

This department is made the clearing-house for baby welfare work for the city. Here the health department, physicians and nurses receive their instructions, and to this department are referred the difficult and troublesome cases arising at the various clinics scattered throughout the city.

When babies are discharged from the infant ward the mother is instructed to bring her baby regularly to the well babies' clinic, so that the baby may be examined and weighed, and advice given to the mother how to keep it well.

CHEMICAL LABORATORY.

Through the munificence of John Ross Robertson, there has been equipped a chemical laboratory for research in diseases of children from the standpoint of nutrition, and through the generosity of Mrs. W. C. Teagle there has been established a fund to defray the expenses of this laboratory, and pay an expert chemist.

Equipment.

The equipment of the hospitals has been improved in many ways during the year.

The following hospitals have established X-Ray departments at a cost of from $500.00 to $2,500.00:

St. Joseph's Hospital, Peterborough; Royal Alexandra, Fergus, Ont.; Cornwall General Hospital.

This equipment is now deemed almost indispensable even in our smaller hospitals.

At the new McKellar General Hospital, Fort William, a new elevator is being installed at a cost of over $4,000.00.

The Ross Memorial Hospital, Lindsay, has also installed a new elevator.

A new electric elevator is in course of construction at the St. Vincent de Paul Hospital, Brockville, and an elevator is also being constructed at the Welland County General Hospital.

Preparations are under way to install an electric elevator at St. Joseph's Hospital, Chatham.

An elevator is a great help in any hospital of more than one storey in height, and when we consider the nursing service, the domestic and diet service, and the admission of patients to the upper floors, it will be seen that an elevator is not only a help but an economy, by enabling a smaller staff to carry on the work.

A new heating system has been provided for the Amasa Wood Hospital, St. Thomas. Sarnia General and Grace Hospital, Toronto, have enlarged and improved the heating systems.

Kitchens and Diet Kitchens.

Nothing facilitates the general work of the hospital more than improvements in the kitchens and diet kitchens. Grace Hospital, Toronto, has improved the diet kitchens, and has provided new steam tables. The Bruce County General Hospital, at Walkerton, has re-constructed the kitchen and installed a new range. The Sault Ste. Marie General Hospital have a new kitchen with a refrigerating plant. The St. Vincent de Paul Hospital, Brockville, has provided three fully equipped diet kitchens with a steam serving table, Alexander Ware sink and tray cabinet.

The Laundry.

The report of Wingham General Hospital draws attention to the fact that the Ladies' Committee have added important equipment to the laundry. St. Joseph's Hospital, Peterborough, has placed new electrical equipment in their steam laundry. Cobourg General has improved the laundry, and in Strathroy Hospital a complete steam laundry has been opened in a separate concrete building, while the Public General Hospital, Chatham, has erected a new laundry at a total cost of $4,500.00.

Nurses' Residences.

The Woodstock Hospital reports that the Nurses' Residence has been a great benefit to the staff. Not one case of serious illness has occurred there since the nurses left the Main Building to enter their new Residence.

The Welland County Hospital has rented a house for a Nurses' Residence, and several other hospitals are planning to improve the Nurses' Residence.

Open-Air Wards.

It is interesting and encouraging to see how many hospitals are building sun-rooms and roof gardens, enclosing verandahs with glass so that they can be used in winter, converting verandahs into sleeping porches, and otherwise improving the open-air facilities of the hospital. This has been done during the year in Stratford General, Cobourg General, Galt General and other hospitals.

Grounds and Gardens.

The grounds of St. Joseph's Hospital, Peterboro, have been improved, and also the grounds of Cobourg Hospital, where 1,000 tulips have been planted by the Horticultural Society.

The ground and gardens of St. Joseph's Hospital, Kenora, have been enlarged.

Every hospital should have a garden.

Toronto General Hospital.

In Toronto General Hospital during the past year a special clinic for the diagnosis and treatment of syphilis has been established in connection with the Social Service Department. A staff nurse to do "follow up" work has been appointed to this clinic, with a result that on some days as many as eighty patients present themselves for care and treatment. The Social Service Department has developed greatly, notably in the Department of Obstetrics and in the Psychiatric Clinic, and the Out-Patient Department has steadily increased in attendance. Many additions have been made to the X-Ray equipment, and of late the average number of patients attending this Department during the day has been something like seventy.

Typhoid Fever.

At least one or two patients with typhoid fever were cared for in most of the hospitals in Ontario during the past year, but this dread disease is gradually disappearing.

Acute Anterior Poliomyelitis.

There can be no doubt that the careful isolation and treatment of patients with infantile paralysis in our hospitals, and the constant skilled medical care and nursing afforded to them, aided in protecting the community, especially the children, and reducing the number of persons who were exposed to the danger of infection in 1916. We must now devote ourselves to devising and carrying out in the hospitals and homes the very best treatment for preventing or minimizing the disablement which this disease causes.

Fire.

Fortunately there has been no fire in any hospital in Ontario during the official year. Some hospitals have wisely increased their fire protection, notably Ottawa Maternity Hospital, Cornwall General and Galt General. The utmost care and attention must always be given to this matter and fire protection and facilities for escape in case of fire must be ample and satisfactory.

The Hospitals of Northern Ontario.

A good hospital is a valuable asset to any community. But there are times when it is much more. In the time of sudden calamity it is the only hope of the sufferers for treatment or rescue. Such a time came in Northern Ontario on the last three days of July, 1916, when a great fire swept over that part of the Province. There are now in that district seven hospitals, three public hospitals, at Cochrane, New Liskeard and Haileybury, and four private hospitals, at Timmins, South Porcupine, Iroquois Falls and Cobalt, and each one of these was a great help in a time of great need. The Cochrane Hospital is fortunately a little way north of the town and of the beautiful lake round which the town is built. The fire raged on all four sides of that hospital and once came within fifty feet of the north wall. The staff and patients behaved like heroes.

Report of Cases.

At the time of the fire Cochrane Hospital had seventeen bed patients and only three empty beds. They managed to accommodate fourteen more patients, of whom only one died, and he was a typhoid patient who had been in bed two weeks and had to walk four miles into the town. Twenty patients, all of whom did well, came to the hospital daily for dressings and treatment.

New Liskeard, Haileybury and Iroquois Falls.

The Lady Minto Hospital at New Liskeard took in and cared for twenty-nine persons who were victims of the fire and more or less seriously injured, two of them being maternity patients, each of whom fortunately reached the hospital before the birth of her child. Thus did this hospital help the people from Matheson and Monteith and the surrounding country.

Providence Hospital at Haileybury took care of thirty people who came there seriously burned, some of them in a condition of shock and collapse. Many of the patients did well and were soon able to be discharged, but others, bereaved of many of their relatives and more seriously injured than the others, remained a long time before they recovered.

Sanatoria.

The Royal Ottawa Sanatorium is represented overseas by three nurses from its staff. The Queen Alexandra Sanatorium at London is represented overseas by a former lady superintendent, one of the medical staff and nine employees. Brantford Sanatorium is also represented at the front. From the Mountain Sanatorium in Hamilton the head nurse has gone overseas to work in military service. About thirty ex-patients have enlisted, nearly all of whom have continued in the service and several are now at the front. Two of these went over with the first Canadian contingent and have been in active service practically ever since.

From the Toronto Free Hospital for Consumptives at Weston several medical officers and six nursing sisters have gone overseas, and from the medical staff at the Muskoka Free Hospital three members are in khaki, two of whom are already overseas. From the Muskoka Cottage Sanatorium a number of the employees have gone overseas and one medical officer, the late Dr. W. Evans, of St. Mary's, has made the supreme sacrifice of his life for his country while on active service in France.

It is well known that practically all the sanatoria in the Province are caring for returned soldiers.

The Mowat Memorial Hospital, Kingston, has been taken over by the Military Hospitals Commission, and new buildings are to be erected at Hamilton, London, and elsewhere by an arrangement made between the provincial authorities and the Military Hospitals Commission, for the care of returned soldiers suffering from tuberculosis.

The Kitchener Sanatorium.

The new Kitchener Sanatorium has been completed during the year. It is built on the banks of the Grand River at Freeport on the Preston and Kitchener electric line and overlooks the valley of the Grand River at one of the most picturesque points.

It was about to be opened when, learning of the great need for sanatoria for returned soldiers, the Kitchener Sanatorium Association offered it to the Military Hospitals Commission. Some thirty or more soldiers have been admitted and it is expected soon by the addition of a pavilion to accommodate twice that number.

This sanatorium is said to be one of the best built and best located in the Province. The cost, including the land, which comprises sixteen acres, was $29,000.00.

Progress.

At nearly all the sanatoria in the Province progress has been made during the year in increasing accommodation, providing new equipment, etc. Thus, the Queen Alexandra Sanatorium at London has increased the accommodation in the dining-room and kitchen buildings and has had a considerable increase in the number of patients cared for.

For the Essex County Sanatorium a Free Dispensary at Windsor was opened in June, and at the close of the year the erection of a new building to cost $30,000.00 was begun at Union-on-the-Lake.

Improvements.

Many improvements have been made at the Royal Ottawa Sanatorium during the year, including better equipment for the diet kitchen and main kitchen, painting, repairing, improvements in the grounds, and also the installation of a new pneumo-thorax apparatus.

The Hamilton Sanatorium.

At the Mountain Sanatorium at Hamilton the rebuilding of some of the small pavilions has been going on during the year, and the new infirmary is almost ready for occupation.

The Brant Sanatorium.

The Brant Sanatorium near Brantford has opened its new pavilion. It is modern, steam-heated, and will accommodate ten patients. Great interest is manifested in this institution by the people of the city and neighbourhood, and this is a great help in making the patients happy and comfortable.

Weston.

Many improvements have been made during the year in the Toronto Free Hospital for Consumptives. Two new buildings have been erected, the Davies' Cottage and the new wing. The Davies' Cottage is a two storey brick building to accommodate twenty children under two years of age, the gift of William Davies, Toronto. It cost $8,000.00. An additional wing to the main building to provide accommodation for forty-four adults is almost completed at a cost of $30,000.00. With these additions the total capacity of the institution will be three hundred and ninety beds. The additions to equipment are: High efficiency electrical apparatus, $290.00, and modern refrigerating plant, $4,000.00. Arrangements have been completed with the City of Toronto and the Township of York, whereby water mains will be laid, so that the institution may be supplied with water from the City of Toronto. This is a great improvement.

Muskoka.

At the Muskoka Free Hospital for Consumptives a new infirmary of forty-one rooms has been erected and is now in use. Three new pavilions to accommodate twenty patients each have been completed and a fourth to accommodate forty patients is nearly ready. Four small cottages have been built for the use of the household staff.

At the Muskoka Cottage Sanatorium a good deal of renovation and repairing has been done, a new refrigerator has been built, all the verandahs have been screened, some new verandahs have been built and X-Ray and other apparatus has been added to the equipment.

General Management.

Much care and interest has been shown in the management of the affairs of most of these institutions during the year. The directors and their officers have met financial and other difficulties of a time of war by increased economy and prudent planning. Necessary repairs have been attended to and every effort has been made to carry on the work with efficiency and comfort. No new buildings have been erected, but in some of the homes and orphanages extensive re-construction has taken place, which has gone far towards providing many of the advantages of a new building. This has been the case in the Boys' Home, Toronto, and a great many improvements have been made in the Home for the Friendless, Chatham, and the Home for Aged People, London.

Improvements.

Important improvements have also been made in the Loyal True Blue Orphanage, Picton; St. Joseph's Orphanage, Fort William; The Thomas Williams' Home, St. Thomas; St. Mary's Orphanage, Hamilton; The Orphanage of St. Mary of the Lake, Kingston; St. Joseph's Home, Ottawa, and the Orphans' Home, Ottawa. In the House of Providence, Toronto, the provision of new lavatories has transformed certain parts of the building to the great help and benefit of the inmates.

Gardens.

Gardens, lawns and playgrounds have been improved at the Kitchener Orphanage, and at the Hospital for Incurable Children, Toronto, the land at the north of the building has been ploughed and prepared for a kitchen garden to be planted next spring. Every such institution in the Province should have a garden.

One of the finest gardens in the Province is that at Peterborough Protestant Home.

The House of Providence, Peterborough, has a garden, and half an acre of new ground was cultivated last year with good results. In this House no less than twenty-one different improvements or advances have been made this year, including the purchase of two cows and the provision of a new kitchen. The combined effect (of all these) is excellent and gives the House a distinctly improved position.

The directors of the Home for the Aged and Infirm, Kingston, have purchased about an acre and a half of land to add to the former grounds and garden and have made no less than eighteen different improvements and additions to the main building and the out-buildings. All of these are highly important to the work of the Home. The income from the garden this year is $517.45.

The Preventorium.

The Preventorium established near Toronto by the Imperial Order of the Daughters of the Empire deserves to rank as the Preventive Department of the Sanatoria. There were 156 patients under treatment during the year, 77 of these being boys and 79 girls, including 38 Canadians, 58 English, 5 Irish, 17 Scotch and 38 foreigners. The children respond readily to the treatment; fresh air, nourishing food and rest produce gratifying results, evidenced by rosy cheeks, strong bodies and steady nerves. The new infirmary and the new gymnasium have been a great help.

The Friendless.

Several homes and refuges in the Province give invaluable protection and training to strangers and young girls who are more or less friendless. One of the most important and successful of these is the Victor Home, Toronto.

Health.

The general good health of the inmates of our public institutions speaks well for the care and attention given to the inmates. For example, in the Haven, Toronto, there were 224 persons, some of them neglected mothers with young children, cared for and sheltered during the year, but there was not much sickness among them and not one death.

County Houses of Refuge.

There is no County House in Ontario, nor any other public institution, so far as we know, where the inmates between nineteen and ninety years have not knitted socks or done Red Cross work, or helped in some way in these great days.

Farming.

Farming at our county houses is steadily becoming more satisfactory, scientific and well managed.

A new farm property has been bought for the Waterloo County House at Kitchener, and it is intended eventually to erect a new house there, as the present one is practically within the boundaries of Kitchener. At the Leamington House a young apple orchard and three hundred berry bushes were set out this spring.

At the Welland County House $500.00 was spent in under-draining, and at the Essex County House, Leamington, $300.00 worth of ditching has been done. New silos have been erected at Simcoe County House, Beeton, and at Ontario County House, Whitby, the latter at a cost of $325.00.

Modern farm buildings and additions to the present farm buildings have been erected for the Houses at St. Thomas and at Welland.

Improvements.

Necessary repairs have been done and general improvements have been made in nearly all the County Houses this year. Some of these have been not only important but quite extensive. At the Leamington House about $3,000.00 has been spent in erecting fire-escapes, renewing balconies and providing a hot water heating system, and plastering, painting, and equipping some new bedrooms, and installing a new kitchen range. The whole work of the House will be greatly advanced thereby. This is satisfactory and it was a wise and necessary expenditure of money, which is true economy.

A similar excellent report comes from the Whitby House, where over $1,000.00 has been expended in improving the heating, plumbing and laundry equipment, and in providing screens for all doors and windows.

At the Welland House a new wing has been erected, providing an infirmary ward, which has been well equipped, also, additional bedrooms and a drying-room in the basement. This House has been provided with four splendid additions to its equipment, viz., a modern range, a cream separator, a refrigerator and sixty feather pillows for the beds.

The Woodstock House and the Beeton House have had new porches built during the year in addition to general repairs.

The Haldimand House at Simcoe has provided a new icehouse and cold storage plant. At the Elgin County House, St. Thomas, in addition to general repairs the water supply has been improved. The Houses at Stratford and Markdale have erected fire-escapes and improved the roadways, and important repairs have been executed at Markdale which cost about $435.00.

At the Brantford House the electric wiring, which was pronounced unsafe, is being removed and a new and satisfactory system of wiring has been contracted for and will be put in at once. A hospital ward has been fitted up for men and a women's hospital ward will be ready soon.

Among other houses to which repairs have been made, may be mentioned the Lambton County House at Sarnia, and the Kent County House at Chatham, where interior painting and decoration has been done.

At Wentworth County House, at Dundas, a good deal of repairing and painting, nearly all of which was done by the help of the inmates, has been carried out.

It may be mentioned that the screens fitted to every window in this House were all made by one of the inmates.

Mental Defectives.

In this connection it may be mentioned that a number of our matrons have been successful in training inmates who are mentally defective as household assistants, and by constant and patient supervision of them are able to utilize their services on the household staff, although they could not care for themselves outside the institution. The officers of the County Houses of Refuge report a large number of the inmates as being mental defectives from birth or from an early age. One superintendent reports fourteen out of a total of seventy inmates as being mentally defective; another reports fifty per cent., and all agree that there is a large number.

HELEN MacMURCHY, M.D.,

Assistant Inspector.

TABLE I.—Showing the general movements in each hospital separately.

Hospitals.	Location.	Capacity in beds.	Number remaining under treatment on 1st Oct., 1915.	Number admitted during the year ending 30th Sept., 1916.	Number of births in hospital during the year.	Total number under treatment during the year ending 30th Sept., 1916.	Number discharged during the year.	Number who died during the year.	Number remaining under treatment on 30th Sept, 1916.
General Hospital	Toronto	700	521	9,339	859	10,719	9,639	609	471
Grace Hospital	"	121	108	1,827	356	2,291	2,095	92	104
Hospital for Sick Children	"	250	207	2,838	.....	3,045	2,467	370	208
St. Michael's Hospital	"	350	302	4,404	323	5,029	4,466	317	246
Western Hospital	"	253	209	3,511	386	4,106	3,676	269	161
The Orthopedic Hospital	"	35	14	216	.....	230	212	4	14
City Hospital	Hamilton	402	258	6,516	324	7,098	6,343	445	310
St. Joseph's Hospital	"	79	58	1,271	145	1,474	1,347	62	65
Mountain Sanatorium	"	105	93	153	.....	246	132	12	102
General Hospital	Kingston	214	127	3,800	89	4,016	3,773	116	127
Hotel Dieu Hospital	"	160	85	2,290	73	2,448	2,261	96	91
General Protestant Hospital	Ottawa	154	114	2,825	5	2,944	2,704	123	117
Roman Catholic Hospital	"	300	150	3,100	3	3,253	2,991	118	144
Maternity Hospital	"	26	41	555	524	1,120	1,064	22	34
St. Luke's General Hospital	"	150	93	2,558	1	2,652	2,481	73	98
Royal Sanatorium	"	68	56	146	.....	202	96	45	61
General Hospital	London	350	195	3,468	259	3,922	3,495	219	208
St. Joseph's Hospital	"	153	66	1,393	170	1,629	1,473	65	91
Queen Alexandra Sanator'm	"	90	73	136	.....	209	134	.....	75
General and Marine Hosp.	St. Catharines	80	57	1,089	178	1,324	1,186	89	49
Consumptive Sanatorium	"	20	11	25	.....	36	15	6	15
General Hospital	Galt	60	29	806	93	928	842	59	37
General Hospital	Guelph	100	54	1,334	82	1,470	1,329	70	71
St. Joseph's Hospital	"	68	46	760	38	844	784	26	34
General Hospital	Pembroke	95	45	826	.....	871	786	42	43
Cottage Hospital	"	35	18	284	30	332	297	21	14
General Hospital	Mattawa	47	24	307	.....	331	298	9	24
General Hospital	Brantford	135	58	1,596	73	1,727	1,553	85	89
St. Joseph's Hospital	Port Arthur	150	42	1,027	74	1,143	1,064	46	33
Railway, Mar. & Gen. Hosp.	"	53	29	620	31	680	627	22	31
General Hospital	Belleville	100	42	927	70	1,039	970	44	25
St. Vincent de Paul Hosp.	Brockville	90	48	1,146	56	1,250	1,153	49	48
General Hospital	"	80	37	915	60	1,012	930	40	42
General and Marine Hospital	Collingwood	60	28	429	19	476	417	23	36
Nicholls' Hospital	Peterborough	80	36	1,097	87	1,220	1,125	57	38
St. Joseph's Hospital	"	50	23	704	43	770	709	24	37
Hotel Dieu Hospital	Windsor	125	47	1,262	119	1,428	1,284	87	57
St. Joseph's Hospital	Chatham	70	37	676	90	803	719	42	42
General Hospital	"	85	34	745	94	873	790	41	42
General Hospital	Stratford	65	35	638	60	733	653	59	21
Amasa Wood Hospital	St. Thomas	64	30	776	119	925	837	55	33
General and Marine Hosp.	Owen Sound	60	32	545	68	645	567	55	23
St. Joseph's Hospital	Sudbury	165	69	1,437	55	1,561	1,411	71	79
General Hospital	Woodstock	50	21	564	43	628	567	36	25
Kitchener and Waterloo Hosp.	Kitchener	70	29	935	71	1,035	940	60	35
General Hospital	Sarnia	75	37	593	85	715	630	58	27
Royal Victoria Hospital	Barrie	75	43	875	78	996	938	19	39
Hotel Dieu Hospital	Cornwall	105	37	1,072	45	1,154	1,078	35	41
General Hospital	"	60	32	770	35	837	771	23	43
Muskoka Cottage Sanatorium	Gravenhurst	104	33	123	.....	156	103	5	48
Muskoka Free Hosp. for Con.	"	279	224	452	1	677	398	39	240
General Hospital	Kenora	30	7	216	18	241	215	12	14
St. Joseph's Hospital	"	40	14	132	7	153	128	9	16
General Hospital	Sault Ste.Mar.	90	39	727	38	804	715	50	39
Victoria General Hospital	Renfrew	30	27	450	24	501	456	23	22
Ross Memorial Hospital	Lindsay	55	22	486	25	533	490	24	19
McKellar General Hospital	Fort William	150	53	1,720	169	1,942	1,774	105	63
General Hospital	Walkerton	28	13	272	11	296	269	16	11
Queen Victoria Hospital	North Bay	40	22	434	66	522	482	18	22
General Hospital	Midland	18	12	165	21	198	174	15	9
St. Francis' Hospital	Smith's Falls	60	26	486	25	537	493	16	28
King Edward Sanatorium	Weston	328	211	453	.....	764	282	183	299
Free Hospital for Consump.	"								
Queen Mary Hosp. for Children	"								
Victorian Hospital	Almonte	14	8	133	22	163	148	8	7
General Hospital	Niagara Falls	20	12	451	41	504	452	25	27
General Hospital	Wingham	20	9	136	10	155	140	10	5
General and Marine Hosp.	Goderich	14	6	122	21	149	140	6	3
Lady Minto Hospital	New Liskeard	30	4	163	8	175	153	14	8
Royal Alexandra Hospital	Fergus	60	22	282	24	328	287	26	15
General Hospital	Parry Sound	40	17	308	14	339	305	19	15
General Hospital	Orillia	25	19	517	30	566	532	24	10
General Hospital	Welland	50	25	929	33	987	902	55	30
General Hospital	Ingersoll	20	6	175	34	215	186	14	15
General Hospital	Kincardine	14	7	92	12	111	102	5	4
General Hospital	Cobourg	34	11	387	18	416	386	21	9
General Hospital	Oshawa	30	25	560	39	624	562	31	31
Charlotte E. Englehart Hosp.	Petrolea	20	16	171	18	205	180	16	9
General Hospital	Penetang	25	5	141	29	175	166	4	5

TABLE I.—Showing the general movements in each hospital separately.—Concluded.

Hospitals.	Location.	Capacity in beds.	Number remaining under treatment on 1st Oct., 1915.	Number admitted during the year ending 30th Sept., 1916.	Number of births in hospital during the year.	Total number under treatment during the year ending 30th Sept., 1916.	Number discharged during the year.	Number who died during the year.	Number remaining under treatment on 30th Sept., 1916.
General Hospital	Orangeville	16	7	138	.....	145	116	22	7
General Hospital	Port Hope	25	6	341	20	367	350	11	6
General Hospital	Bowmanville	19	11	247	21	279	254	15	10
Mowat Sanatorium	Kingston	35	24	66	.....	90	54	16	20
Public Hospital	Smith's Falls	64	22	487	41	553	482	33	38
Brant Sanatorium	Brantford	24	14	38	.....	52	28	8	16
Preventorium	Toronto	60	28	128	.....	156	118	.....	38
Essex Co. Tuberculosis Hospital.	Kingsville	20	15	41	.....	56	35	2	19
Providence Hospital	Haileybury	84	16	767	15	798	721	34	43
Lady Minto Hospital	Chapleau	20	7	140	25	172	160	8	4
General Hospital	Strathroy	40	12	148	16	176	154	7	15
Women's College Hospital	Toronto	22	12	248	97	357	332	5	20
Lady Minto Hospital	Cochrane	20	.....	92	9	101	78	8	15
Misericordia Maternity Hosp.	Ottawa	193	139	356	199	694	433	136	125
St. Joseph's General Hospital	Parry Sound.	45	17	340	14	371	323	31	17
Totals for 1916	.....		5,205	89,386	6,631	101,222	90,367	5,541	5,314
Totals for 1915	.....		4,475	74,807	5,727	85,009	75,285	4,707	5,017

TABLE II.—Showing the collective stay in days of the adult and infant patients, also the average length of time each patient was under treatment.

Hospitals.	Location.	Number of patients including infants born.	Collective stay of infants, under one year of age.	Collective stay of adult patients.	Total collective stay of adults and infants.	Average stay of each patient including infants.
General Hospital	Toronto	10,719	12,510	182,586	195,096	18.2
Grace Hospital	"	2,291	5,138	32,128	37,266	16.1
Hospital for Sick Children	"	3,045	.....	72,783	72,783	23.7
St. Michael's Hospital	"	5,029	4,207	97,647	101,854	20.2
Western Hospital	"	4,106	3,860	69,048	72,908	17.7
The Orthopedic Hospital	"	230	116	5,458	5,574	24.2
City Hospital	Hamilton	7,098	7,412	101,030	108,442	15.2
St. Joseph's Hospital	"	1,474	2,034	21,362	23,396	15.8
Mountain Sanatorium	"	246	.....	34,851	34,851	141.6
General Hospital	Kingston	4,016	1,136	52,490	53,626	13.3
Hotel Dieu Hospital	"	2,448	1,338	35,200	36,538	14.9
General Protestant Hospital	Ottawa	2,944	1,097	43,509	44,606	15.1
Roman Catholic Hospital	"	3,253	792	54,123	54,915	16.7
Maternity Hospital	"	1,120	6,167	6,954	13,121	11.7
St. Luke's General Hospital	"	2,652	667	36,383	37,050	13.9
Royal Sanatorium	"	202	.....	21,326	21,326	105.5
General Hospital	London	3,922	4,836	65,699	70,535	17.9
St. Joseph's Hospital	"	1,629	2,082	26,414	28,496	17.3
Queen Alexandra Sanatorium	"	209	.....	25,068	25,068	119.9
General and Marine Hospital	St. Catharines	1,324	2,247	15,854	18,101	13.6
Consumptive Sanatorium	"	36	.....	2,676	2,676	74.3
General Hospital	"	928	1,425	11,215	12,640	13.5
General Hospital	Galt	1,470	1,202	22,710	23,912	16.2
St. Joseph's Hospital	Guelph	844	802	14,994	15,796	18.7
General Hospital	"	871	.....	17,990	17,990	20.6
Cottage Hospital	Pembroke	332	280	5,175	5,455	16.4
General Hospital	"	331	.....	8,282	8,282	25.0
General Hospital	Mattawa	1,727	1,091	24,623	25,714	14.3
St. Joseph's Hospital	Brantford	1,143	95	15,490	15,585	13.6
Railway, Mar. & Gen. Hosp.	Port Arthur	680	646	8,611	9,257	13.8
General Hospital	"	1,039	871	14,769	15,640	15.0
St. Vincent de Paul Hospital	Belleville	1,250	835	21,631	22,466	17.9
General Hospital	Brockville	1,012	953	14,803	15,756	15.0
General and Marine Hospital	"	476	283	8,575	8,858	12.3
Nicholls' Hospital	Collingwood	1,220	1,150	15,024	16,174	13.1
St. Joseph's Hospital	Peterborough	770	490	10,290	10,780	14.0
Hotel Dieu Hospital	"	1,428	1,589	16,297	17,886	12.5
St. Joseph's Hospital	Windsor	803	1,104	9,988	11,092	13.8
General Hospital	Chatham	873	1,194	12,947	14,141	16.2
General Hospital	"	733	730	12,310	13,040	18.0
Amasa Wood Hospital	Stratford	925	1,242	11,187	12,429	13.4
General and Marine Hospital	St. Thomas	645	741	10,422	11,163	17.3
St. Joseph's Hospital	Owen Sound	1,561	823	25,898	26,721	17.1
General Hospital	Sudbury	628	472	9,118	9,590	15.2
Kitchener and Waterloo Hospital	Woodstock	1,035	1,103	12,356	13,459	13.0
General Hospital	Kitchener	715	881	12,307	13,188	18.4
Royal Victoria Hospital	Sarnia	996	1,211	22,283	23,494	18.7
Hotel Dieu Hospital	Barrie	1,154	465	16,458	16,923	14.6
General Hospital	Cornwall	837	435	12,106	12,541	14.9
Muskoka Cottage Sanatorium	"	156	.....	15,098	15,098	.....
Muskoka Free Hosp. for Consump.	Gravenhurst	677	.....	95,973	95,973	.....
General Hospital	"	241	286	2,850	3,136	13.0
St. Joseph's Hospital	Kenora	153	231	5,058	5,289	34.5
General Hospital	"	804	215	15,278	15,493	19.2
Victoria General Hospital	Sault Ste. Marie	501	390	7,395	7,785	15.5
Ross Memorial Hospital	Renfrew	523	324	7,418	7,742	14.1
McKellar General Hospital	Lindsay	1,942	2,532	22,305	24,837	12.8
General Hospital	Fort William	296	277	3,712	3,989	13.4
Queen Victoria Hospital	Walkerton	522	605	6,228	6,833	13.0
General Hospital	North Bay	198	319	2,442	2,761	13.9
St. Francis' Hospital	Midland	537	510	7,696	8,206	15.2
King Edward Sanatorium	Smith's Falls					
Free Hospital for Consumptives	Weston	764	.....	112,031	112,031	146.6
Queen Mary Hosp. for Children	"					
Victorian Hospital	"	163	321	4,335	4,656	28.5
General Hospital	Almonte	504	472	6,797	7,269	14.4
General Hospital	Niagara Falls	155	105	2,338	2,443	15.7
General and Marine Hospital	Wingham	149	307	1,638	1,945	13.0
Lady Minto Hospital	Goderich	175	118	2,718	2,836	16.2
Royal Alexandra Hospital	New Liskeard	328	406	5,907	6,313	19.2
General Hospital	Fergus	339	209	5,521	5,730	16.9
General Hospital	Parry Sound	566	324	6,678	7,002	12.3
General Hospital	Orillia	987	607	10,485	11,092	11.2
General Hospital	Welland	215	369	2,505	2,874	13.4
General Hospital	Ingersoll	111	118	965	1,083	9.7
General Hospital	Kincardine	416	309	5,352	5,661	11.2
General Hospital	Cobourg	624	508	7,361	7,869	12.3
Charlotte E. Englehart Hospital	Oshawa	205	235	4,120	4,355	21.2
	Petrolea					

TABLE II.—Showing the collective stay in days of the adult and infant patients, also the average length of time each patient was under treatment.—Concluded.

Hospitals.	Location.	Number of patients including infants born.	Collective stay of infants, under one year of age.	Collective stay of adult patients.	Total collective stay of adults and infants.	Average stay of each patient including infants.
General Hospital	Penetang	175	290	1,799	2,089	11.9
General Hospital	Orangeville	145	1,003	1,662	2,665	18.3
General Hospital	Port Hope	367	341	3,903	4,244	11.4
General Hospital	Bowmanville	279	303	3,758	4,061	14.5
Mowat Sanatorium	Kingston	90	.....	8,650	8,650	96.1
Public Hospital	Smith's Falls	553	551	8,213	8,764	15.9
Brant Sanatorium	Brantford	52	.....	4,832	4,832	92.9
Preventorium	Toronto	156	.....	12,977	13,977	89.6
Essex Co. Tuberculosis Hospital	Kingsville	56	.....	6,607	6,607	117.9
Providence Hospital	Haileybury	798	234	10,364	10,598	13.2
Lady Minto Hospital	Chapleau	172	233	1,820	2,053	11.9
General Hospital	Strathroy	176	210	2,778	2,988	17.9
Misericordia Maternity Hospital	Ottawa	694	21,413	26,249	47,662	68.6
St. Joseph's General Hospital	Parry Sound	371	207	6,107	6,314	17.0
Lady Minto Hospital	Cochrane	101	.....	1,328	1,328	13.1
Women's College Hospital	Toronto	357	24	5,737	5,761	16.0
Totals for 1916		101,222	112,658	1,878,436	1,991,094	19.6
Totals for 1915		85,009	80,498	1,676,755	1,766,253	20.8

TABLE III.—Showing the deductions which have to be made from the collective stay of patients for the protracted residence of incurables, lying-in cases, etc. For persons coming within these classes only seven cents per day is allowed.

Hospitals.	Location.	Collective days' stay, exclusive of infants under one year of age.	Deduct for incurables and lying-in cases, for which only Refuge rate is allowed, also deduct the days' stay of patients who paid over $7.00 per week.	No. of days' stay for which hospital allowance is made.
General Hospital	Toronto	182,586	57,649	124,937
Grace Hospital	"	32,128	12,163	19,965
Hospital for Sick Children	"	72,783	14,629	58,154
St. Michael's Hospital	"	97,647	19,460	78,187
Western Hospital	"	69,048	27,536	41,512
The Orthopedic Hospital	"	5,458	4,254	1,204
City Hospital	Hamilton	101,030	32,229	68,801
St. Joseph's Hospital	"	21,362	8,086	13,276
Mountain Sanatorium	"	34,851		34,851
General Hospital	Kingston	52,490	38,498	13,992
Hotel Dieu Hospital	"	35,200	15,349	19,851
General Protestant Hospital	Ottawa	43,509	26,650	16,859
Roman Catholic Hospital	"	54,123	28,803	25,320
Maternity Hospital	"	6,954	4,440	2,514
St. Luke's General Hospital	"	36,383	26,123	10,260
Royal Sanatorium	"	21,326		21,326
General Hospital	London	65,699	26,882	38,817
St. Joseph's Hospital	"	26,414	18,467	7,947
Queen Alexandra Sanatorium	"	25,068		25,068
General and Marine Hospital	St. Catharines	15,854	8,236	7,618
Consumptive Sanatorium	"	2,676		2,676
General Hospital	Galt	11,215	5,446	5,769
General Hospital	Guelph	22,710	8,536	14,174
St. Joseph's Hospital	"	14,994	4,106	10,888
General Hospital	Pembroke	17,990	5,284	12,706
Cottage Hospital	"	5,175	2,230	2,945
General Hospital	Mattawa	8,282	737	7,545
General Hospital	Brantford	24,623	7,831	16,792
St. Joseph's Hospital	Port Arthur	15,490	5,842	9,648
Railway, Mar. & Gen. Hosp.	"	8,611	516	8,095
General Hospital	Belleville	14,769	8,126	6,643
St. Vincent de Paul Hospital	Brockville	21,631	9,675	11,956
General Hospital	"	14,803	11,418	3,385
General and Marine Hospital	Collingwood	8,575	4,263	4,312
Nicholls' Hospital	Peterborough	15,024	6,773	8,251
St. Joseph's Hospital	"	10,290	3,266	7,024
Hotel Dieu Hospital	Windsor	16,297	3,641	12,656
St. Joseph's Hospital	Chatham	9,988	6,898	3,090
General Hospital	"	12,947	8,397	4,550
General Hospital	Stratford	12,310	5,050	7,260
Amasa Wood Hospital	St. Thomas	11,187	3,112	8,075
General and Marine Hospital	Owen Sound	10,422	6,121	4,301
St. Joseph's Hospital	Sudbury	25,898	5,373	20,525
General Hospital	Woodstock	9,118	4,294	4,824
Kitchener and Waterloo Hosp.	Kitchener	12,356	7,832	4,524
General Hospital	Sarnia	12,307	6,994	5,313
Royal Victoria Hospital	Barrie	22,283	4,319	17,964
Hotel Dieu Hospital	Cornwall	16,458	5,587	10,871
General Hospital	"	12,106	7,551	4,555
Muskoka Cottage Sanatorium	Gravenhurst	15,098		15,098
Muskoka Free Hosp. for Consump.	"	95,973		95,973
General Hospital	Kenora	2,850	1,548	1,302
St. Joseph's Hospital	"	5,058	3,266	1,792
General Hospital	Sault Ste. Marie	15,278	2,956	12,322
Victoria General Hospital	Renfrew	7,395	3,934	3,461
Ross Memorial Hospital	Lindsay	7,418	3,734	3,684
McKellar General Hospital	Fort William	22,305	10,003	12,302
General Hospital	Walkerton	3,712	1,621	2,091
Queen Victoria Hospital	North Bay	6,228	2,486	3,742
General Hospital	Midland	2,442	880	1,562
St. Francis' Hospital	Smith's Falls	7,696	3,698	3,998
King Edward Sanatorium	Weston			
Free Hospital for Consumptives	"	112,031		112,031
Queen Mary Hosp. for Children	"			
Victorian Hospital	Almonte	4,335	2,078	2,257
General Hospital	Niagara Falls	6,797	1,007	5,790
General Hospital	Wingham	2,338	90	2,248
General and Marine Hospital	Goderich	1,638	39	1,599
Lady Minto Hospital	New Liskeard	2,718	308	2,410
Royal Alexandra Hospital	Fergus	5,907	4,352	1,555
General Hospital	Parry Sound	5,521	1,336	4,185
General Hospital	Orillia	6,678	356	6,322
General Hospital	Welland	10,485	641	9,844
General Hospital	Ingersoll	2 505	96	2,409
General Hospital	Kincardine	965	18	947
General Hospital	Cobourg	5,352	223	5,129
General Hospital	Oshawa	7,361	53	7,308
Charlotte E. Englehart Hosp.	Petrolea	4,120	564	3,556

TABLE III.—Showing the deductions which have to be made from the collective stay of patients for the protracted residence of incurables, lying-in cases, etc. For persons coming within these classes only seven cents per day is allowed.—Concluded.

Hospitals.	Location.	Collective days' stay, exclusive of infants under one year of age	Deduct for incurables and lying-in cases for which only Refuge rate is allowed, also deduct the days' stay of patients who paid over $7.00 per week.	No. of days' stay for which hospital allowance is made.
General Hospital	Penetang	1,799	223	1,576
General Hospital	Orangeville	1,662	134	1,528
General Hospital	Port Hope	3,903	458	3,445
General Hospital	Bowmanville	3,758	251	3,507
Mowat Sanatorium	Kingston	8,650	.....	8,650
Public Hospital	Smith's Falls	8,213	658	7,555
Brant Sanatorium	Brantford	4,832	.....	4,832
Preventorium	Toronto	13,977	.....	13,977
Essex Co. Tuberculosis Hospital	Kingsville	6,607	.....	6,607
Providence Hospital	Haileybury	10,364	1,497	8,867
Lady Minto Hospital	Chapleau	1,820	122	1,698
General Hospital	Strathroy	2,778	173	2,605
Misericordia Maternity Hosp	Ottawa	26,249	20,220	6,029
St. Joseph's General Hosp	Parry Sound	6,107	314	5,793
Lady Minto Hospital	Cochrane	1,328	270	1,058
Women's College Hospital	Toronto	5,737	57	5,680
Totals for 1916	.....	1,878,436	598,336	1,280,100
Totals for 1915	.....	1,677,755	474,667	1,202,088

TABLE IV.—Relative to income of Hospitals.

Hospitals.	Location.	Amount received from municipalities as a grant and for patients' maintenance.	Amount received from patients for board.	Amount received as income from property or investments belonging to hospital.	Subscriptions and donations of private individuals and incidental receipts.	Total receipts from all sources other than the Government grant.
		$ c.	$ c.	$ c.	$ c.	$ c.
General Hospital	Toronto	102,737 38	205,559 79	37,779 48	45,795 73	391,872 38
Grace Hospital	"	14,561 59	38,739 85	2,837 48	2,560 14	58,699 06
Hospital for Sick Children	"	62,927 74	25,353 23	1,841 00	43,960 03	134,082 00
St. Michael's Hospital	"	58,451 00	63,658 56	.....	14,897 89	137,007 45
Western Hospital	"	34,837 30	72,570 18	.....	5,962 57	113,370 05
The Orthopedic Hospital	"	.....	9,770 52	138 24	10 00	9,918 76
City Hospital	Hamilton	93,582 22	64,596 31	.....	58 78	158,237 31
St. Joseph's Hospital	"	2,512 55	21,552 83	585 00	249 86	24,900 24
Mountain Sanatorium	"	15,700 03	7,649 39	652 71	.....	24,002 13
General Hospital	Kingston	10,425 00	55,583 48	.....	4,636 16	70,644 64
Hotel Dieu Hospital	"	4,460 00	25,702 69	.....	2,664 10	32,826 79
General Protestant Hospital	Ottawa	17,768 80	58,308 99	.....	27,229 94	103,307 73
Roman Catholic Hospital	"	19,190 30	47,758 78	.....	6,425 25	73,374 33
Maternity Hospital	"	1,675 00	14,516 94	.....	1 445 13	17,637 07
St. Luke's General Hospital	"	9,990 00	51,775 53	.....	4,790 03	66,555 56
Royal Sanatorium	"	23,026 71	2,229 95	.....	.....	25,256 66
General Hospital	London	76,841 51	54,860 43	537 17	4,035 29	136,274 40
St. Joseph's Hospital	"	3,280 50	42,436 87	.....	1,629 40	47,346 77
Queen Alexandra Sanatorium	"	18,563 93	3,420 68	1,157 38	1,892 00	25,033 99
General and Marine Hospital	St. Catharines	2,194 00	20,732 40	45 00	3,219 37	26,190 77
Consumptive Sanatorium	"	2,213 35	402 90	82 86	129 69	2,828 80
General Hospital	Galt	4,600 00	13,712 28	452 00	.....	18,764 28
General Hospital	Guelph	3,426 85	31,294 30	.....	7,943 19	42,664 34
St. Joseph's Hospital	"	3,226 40	11,153 50	.....	1,087 60	15,467 50
General Hospital	Pembroke	2,197 70	8,818 64	.....	2,368 97	13,385 31
Cottage Hospital	"	935 19	4,786 97	.....	1,834 23	7,556 39
General Hospital	Mattawa	540 00	2,797 00	90 00	1,435 75	4,862 75
General Hospital	Brantford	17,175 00	23,619 68	107 11	1,400 16	42,301 95
St. Joseph's Hospital	Port Arthur	5,990 00	15,111 61	.....	4,992 00	26,093 61
Railway, Mar. & Gen. Hosp.	"	9,573 87	11,276 90	.....	2,241 25	23,092 02
General Hospital	Belleville	1,400 00	17,729 50	188 50	4,788 84	24,106 84
St. Vincent de Paul Hospital	Brockville	2,848 00	17,987 00	.....	5,041 65	25,876 65
General Hospital	"	2,000 00	19,573 90	1,280 32	9,545 85	32,400 07
General and Marine Hospital	Collingwood	2,000 00	9,018 05	.....	103 71	11,121 76
Nicholls' Hospital	Peterborough	1,272 00	19,324 83	10,059 99	95 10	30,751 92
St. Joseph's Hospital	"	1,551 87	9,025 94	.....	146 00	10,723 81
Hotel Dieu Hospital	Windsor	1,015 20	19,064 69	.....	4,224 29	24,304 18
St. Joseph's Hospital	Chatham	1,534 00	13,343 34	.....	816 77	15,694 11
General Hospital	"	1,820 75	17,637 46	.....	.....	19,458 21
General Hospital	Stratford	4,185 00	16,315 05	.....	2,847 75	23,347 80
Amasa Wood Hospital	St. Thomas	8,000 00	11,934 07	714 05	703 37	21,351 49
General and Marine Hosp.	Owen Sound	2,828 00	13,600 73	60 00	548 00	17,036 73
St. Joseph's Hospital	Sudbury	901 50	25,489 20	.....	2,303 98	28,694 68
General Hospital	Woodstock	2,400 00	11,746 51	1,226 69	177 00	15,550 20
Kitchener and Waterloo Hos	Kitchener	6,550 00	13,674 40	.....	288 60	20,513 00
General Hospital	Sarnia	1,600 00	14,308 87	1,130 00	628 48	17,667 35
Royal Victoria Hospital	Barrie	850 00	12,247 04	462 00	332 28	13,891 32
Hotel Dieu Hospital	Cornwall	2,160 00	10,912 43	.....	2,694 77	15,767 20
General Hospital	"	1,900 00	12,969 70	559 95	3,269 77	18,699 42
Muskoka Cottage Sanatorium	Gravenhurst	.....	39,546 01	2,809 29	1,770 84	44,126 14
Muskoka Free Hosp. for Cons.	"	61,171 28	7,370 00	6,331 84	25,655 35	100,528 47
General Hospital	Kenora	1,500 00	3,301 55	.....	595 03	5,396 58
St. Joseph's Hospital	"	1,519 05	1,728 90	793 85	1,272 15	5,313 95
General Hospital	Sault Ste. Marie	1,493 00	18,840 63	.....	1,607 47	21,941 10
Victoria General Hospital	Renfrew	1,122 06	7,426 74	.....	69 00	8,617 80
Ross Memorial Hospital	Lindsay	1,700 00	8,320 00	2,200 88	1,988 36	14,209 24
McKellar General Hospital	Fort William	7,200 00	23,371 96	.....	5,497 72	36,069 68
General Hospital	Walkerton	2,145 25	3,910 72	.....	1,844 70	7,900 67
Queen Victoria Hospital	North Bay	500 00	7,549 97	.....	1,577 36	9,627 33
General Hospital	Midland	950 00	3,048 81	30 92	73 90	4,103 63
St. Francis' Hospital	Smith's Falls	1,050 00	5,341 02	.....	2,025 13	8,416 15
King Edward Sanatorium	Weston	94,259 97	4,262 67	388 07	15,781 00	114,682 71
Free Hosp. for Consumptives	"					
Queen Mary Hosp. for Chdn.	"					
Victorian Hospital	Almonte	465 00	2,477 69	458 15	1,072 16	4,473 00
General Hospital	Niagara Falls	2,550 00	10,862 14	.....	1,462 15	14,874 29
General Hospital	Wingham	525 75	4,061 29	.....	397 54	4,984 58
General and Marine Hospital	Goderich	795 02	2,009 03	30 00	433 95	3,268 00
Lady Minto Hospital	New Liskeard	200 00	2,687 61	....	1,669 92	4,557 53
Royal Alexandra Hospital	Fergus	2,779 40	10,547 35	.....	394 58	13,721 33
General Hospital	Parry Sound	.....	5,156 90	.....	2,489 45	7,646 35
General Hospital	Orillia	1,000 00	8,302 48	.....	337 55	9,640 03
General Hospital	Welland	1,600 00	13,640 03	.....	521 94	15,761 97
General Hospital	Ingersoll	1,500 00	4,170 45	.....	190 50	5,860 95
General Hospital	Kincardine	1,250 00	2,128 70	.....	775 70	4,154 40
General Hospital	Cobourg	1,212 00	7,363 08	.....	828 75	9,403 83
General Hospital	Oshawa	1,100 00	11,030 12	344 56	1,420 50	13,895 18
Charlotte E. Englehart Hosp.	Petrolea	1,900 00	4,381 82	59 00	2,342 96	8,683 78

Table IV.—Relative to income of Hospitals.—Concluded.

Hospitals.	Location.	Amount received from municipalities as a grant and for patients' maintenance.	Amount received from patients for board.	Amount received as income from property or investments belonging to hospital.	Subscriptions and donations of private individuals and incidental receipts.	Total receipts from all sources other than the Government grant.
		$ c.	$ c.	$ c.	$ c.	$ c.
General Hospital	Penetang	800 00	1,831 70	.....	790 15	3,421 85
General Hospital	Orangeville	300 00	3,406 28	.....	821 92	4,528 20
General Hospital	Port Hope	809 78	4,591 29	900 95	326 50	6,628 52
General Hospital	Bowmanville	850 00	5,540 09	111 35	1,183 09	7,684 53
Mowat Sanatorium	Kingston	1,500 00	7,627 86	.....	2,009 11	11,127 97
Public Hospital	Smith's Falls	1,946 00	12,852 23	973 00	7,335 24	23,106 47
Brant Sanatorium	Brantford	4,052 60	592 79	.....	.....	4,645 39
Preventorium	Toronto	9,039 80	69 00	.....	101 03	9,209 83
Essex Co. Tuberculosis Hosp.	Kingsville	2,978 98	4,093 05	240 10	2,893 69	10,205 82
Providence Hospital	Haileybury	1,657 75	11,895 30	506 83	3,615 02	17,674 90
Lady Minto Hospital	Chapleau	500 00	3,164 75	.....	1,159 90	4,824 65
General Hospital	Strathroy	1,178 00	6,199 98	.....	.....	7,377 98
Misericordia Maternity Hosp.	Ottawa	2,550 00	3,629 85	.....	8,992 05	15,171 90
St. Joseph's General Hospital	Parry Sound	691 00	4,864 73	1,440 00	16 00	7,011 73
Lady Minto Hospital	Cochrane	.....	417 00	.....	899 22	1,316 22
Women's College Hospital	Toronto	2,128 50	6,448 10	.....	2,021 79	10,598 39
Totals for 1916		891,881 43	1,595,715 56	79,605 72	339,702 09	2,906,904 80
Totals for 1915		931,109 64	1,282,263 95	89,703 37	223,607 49	2,526,684 45

TABLE V.—Showing the basis on which statutory aid is granted.

Hospitals.	Location.	Collective days' stay upon which Hospital grants are based.	Collective days' stay upon which computation of Refuge rate is based.	Computation of 7 cents per day, being Refuge rate for improper cases for Hospital treatment.	Amount of grant for proper Hospital cases.	Amount payable to each Hospital from appropriation by the Legislature of 1916.
				$ c.	$ c.	$ c.
General Hospital	Toronto	124,937	8,112	567 84	24,987 40	25,555 24
Grace Hospital	"	19,965	732	51 24	3,993 00	4,044 24
Hospital for Sick Children	"	58,154	10,667	746 69	11,630 80	12,377 49
St. Michael's Hospital	"	78,187	7,348	514 36	15,637 40	16,151 76
Western Hospital	"	41,512	5,098	356 86	8,302 40	8,659 26
The Orthopedic Hospital	"	1,204	1,117	78 19	240 80	318 99
City Hospital	Hamilton	68,801	20,703	1,449 21	13,760 20	15,209 41
St. Joseph's Hospital	"	13,276	2,072	145 04	2,655 20	2,800 24
Mountain Sanatorium	"					
General Hospital	Kingston	13,992	4,749	332 43	2,798 40	3,130 83
Hotel Dieu Hospital	"	19,851	2,640	184 80	3,970 20	4,155 00
General Protestant Hospital	Ottawa	16,859	3,654	255 78	3,371 80	3,627 58
Roman Catholic Hospital	"	25,329	7,064	494 48	5,064 00	5,558 48
Maternity Hospital	"	2,514			502 80	502 80
St. Luke's General Hospital	"	10,260	2,463	172 41	2,052 00	2,224 41
Royal Sanatorium	"					
General Hospital	London	38,817	10,213	714 91	7,763 40	8,478 31
St. Joseph's Hospital	"	7,947	1,430	100 10	1,589 40	1,689 50
Queen Alexandra Sanator'm	"					
General and Marine Hospital	St. Catharines	7,618	458	32 06	1,523 60	1,555 66
Consumptive Sanatorium	"					
General Hospital	Galt	5,769	652	45 64	1,153 80	1,199 44
General Hospital	Guelph	14,174	1,662	116 34	2,834 80	2,951 14
St. Joseph's Hospital	"	10,888	446	31 22	2,177 60	2,208 82
General Hospital	Pembroke	12,706	1,302	91 14	2,541 20	2,632 34
Cottage Hospital	"	2,945	389	27 23	589 00	616 23
General Hospital	Mattawa	7,545	227	15 89	1,509 00	1,524 89
General Hospital	Brantford	18,792	2,514	175 98	3,358 40	3 534 38
St. Joseph's Hospital	Port Arthur	9,648	1,209	84 63	1,929 60	2,014 23
Railway, Mar. & Gen. Hosp.	"	8,095	516	36 12	1,619 00	1,655 12
General Hospital	Belleville	6,643	808	56 56	1,328 60	1,385 16
St. Vincent de Paul Hospital	Brockville	11,956	1,391	97 37	2,391 20	2,488 57
General Hospital	"	3,385	636	44 52	677 00	721 52
General and Marine Hospital	Collingwood	4,312	566	39 62	862 40	902 02
Nicholls' Hospital	Peterborough	8,251	596	41 72	1,650 20	1,691 92
St. Joseph's Hospital	"	7,024	540	37 80	1,404 80	1,442 60
Hotel Dieu Hospital	Windsor	12,656	452	31 64	2,531 20	2,562 84
St. Joseph's Hospital	Chatham	3,090	358	25 06	618 00	643 06
General Hospital	"	4,550	972	68 04	910 00	978 04
General Hospital	Stratford	7,260	1,092	76 51	1,452 00	1,528 51
Amasa Wood Hospital	St. Thomas	8,075	339	23 73	1,615 00	1,638 73
General and Marine Hospital	Owen Sound	4,301	296	20 72	860 20	880 92
St. Joseph's Hospital	Sudbury	20,525	1,707	119 49	4,105 00	4,224 49
General Hospital	Woodstock	4,824	338	23 66	964 80	988 46
Kitchener & Waterloo Hosp.	Kitchener	4,524	852	59 64	904 80	964 44
General Hospital	Sarnia	5,313	1,571	109 97	1,062 60	1,172 57
Royal Victoria Hospital	Barrie	17,964	2,118	148 26	3,592 80	3,741 06
Hotel Dieu Hospital	Cornwall	10,871	1,033	72 31	2,174 20	2,246 51
General Hospital	"	4,555	1,271	88 97	911 00	999 97
Muskoka Cottage Sanatorium	Gravenhurst					
Muskoka Free Hosp. for Cons.	"					
General Hospital	Kenora	1,302	430	30 10	260 40	290 50
St. Joseph's Hospital	"	1,792	2,835	198 45	358 40	556 85
General Hospital	Sault Ste. Marie	12,322	1,241	86 87	2,464 40	2,551 27
Victoria General Hospital	Renfrew	3,461	628	43 96	692 20	736 16
Ross Memorial Hospital	Lindsay	3,684	227	15 89	736 80	752 69
McKellar General Hosp.	Fort William	12,302	2,958	207 06	2,460 40	2,667 46
General Hospital	Walkerton	2,091	353	24 71	418 20	442 91
Queen Victoria Hospital	North Bay	3,742	209	14 63	748 40	763 03
General Hospital	Midland	1,562	139	9 73	312 40	322 13
St. Francis' Hospital	Smith's Falls	3,998	965	67 55	799 60	867 15
King Edward Sanatorium	Weston					
Free Hospital for Cons.	"					
Queen Mary Hosp. for Chldn.	"					
Victorian Hospital	Almonte	2,257	2,078	145 46	451 40	596 86
General Hospital	Niagara Falls	5,790	1,007	70 49	1,158 00	1,228 49
General Hospital	Wingham	2,248	90	6 30	449 60	455 90
General and Marine Hospital	Goderich	1,599	39	2 73	319 80	322 53
Lady Minto Hospital	New Liskeard	2,410	308	21 56	482 00	503 56
Royal Alexandra Hospital	Fergus	1,555	507	35 49	311 00	346 49
General Hospital	Parry Sound	4,185	275	19 25	837 00	856 25
General Hospital	Orillia	6,322	356	24 92	1,264 40	1,289 32
General Hospital	Welland	9,844	641	44 87	1,968 80	2,013 67
General Hospital	Ingersoll	2,409	96	6 72	481 80	488 52
General Hospital	Kincardine	947	18	1 26	189 40	190 66
General Hospital	Cobourg	5,129	223	15 61	1,025 80	1,041 41
General Hospital	Oshawa	7,308	53	3 71	1,461 60	1,465 31

TABLE V.—Showing the basis on which statutory aid is granted.—Concluded.

Hospitals.	Location.	Collective days' stay upon which Hospital grants are based.	Collective days' stay upon which computation of Refuge rate is based.	Computation of 7 cents per day, being Refuge rate for improper cases for Hospital treatment.	Amount of grant for proper Hospital cases.	Amount payable to each Hospital from appropriation by the Legislature of 1916.
				$ c.	$ c.	$ c.
Charlotte E. Englehart Hospital ...	Petrolea.....	3,556	564	39 48	711 20	750 68
General Hospital	Penetang	1,576	223	15 61	315 20	330 81
General Hospital	Orangeville	1,528	134	9 38	305 60	314 98
General Hospital	Port Hope	3,445	458	32 06	689 00	721 06
General Hospital	Bowmanville.....	3,507	251	17 57	701 40	718 97
Mowat Sanatorium	Kingston	.....	.....	.....	.....	.....
Public Hospital	Smith's Falls.....	7,555	668	46 06	1,511 05	1 557 06
Brant Sanatorium.....	Brantford.....	.....	.....	.....	.....	.....
Preventorium.....	Toronto.....	.....	.....	.....	.....	.....
Essex Co. Tuberculosis Hospital..	Kingsville	.....	.....	.....	.....	.....
Providence Hospital.....	Haileybury.....	8,867	1,497	104 79	1,773 40	1.878 19
Lady Minto Hospital	Chapleau.....	1,698	122	8 54	339 60	348 14
General Hospital	Strathroy	2,605	173	12 11	521 00	533 11
Women's College Hospital	To onto	5,680	57	3 99	1,136 00	1,139 99
Lady Minto Hospital	Cochrane	1,058	270	18 90	211 60	230 50
Misericordia Maternity Hospital....	Ottawa	6,029	19,945	1,396 15	1,205 80	2,601 95
St. Joseph's General Hospital	Parry Sound.....	6,793	314	21 98	1,158 60	1.180 58
Totals for 1916.....	.....	939,011	154,716	10,830 12	187,802 20	198,632 32
Totals for 1915	.....	902,041	123,643	8,655 01	180,408 20	189,063 21

TABLE VI.—Showing the cost of maintaining the Hospitals, also the average daily cost per patient, etc.

Hospitals.	Location.	Collective days' stay, exclusive of infants under one year of age.	Cost of dietaries.	Salaries, fuel, light, medicine, bedding and all other expenditure on maintenance account.	Total expenditure for maintenance.	Average cost of each patient per day.
			$ c.	$ c.	$ c.	$ c.
General Hospital	Toronto	182,586	134,594 90	286,357 79	420,952 75	2.30
Grace Hospital	"	32,128	16,841 53	45,742 53	62,584 06	1.94
Hospital for Sick Children	"	72,783	35,822 01	135,234 98	171,056 99	2.35
St. Michael's Hospital	"	97,647	61,296 09	92,712 52	154,008 61	1.57
Western Hospital	"	69,048	36,005 11	94,006 90	130,012 01	1.88
The Orthopedic Hospital	"	5,458	2,321 97	5,048 89	7,370 86	1.35
City Hospital	Hamilton	101,030	54,753 78	110,209 44	164,963 22	1.63
St. Joseph's Hospital	"	21,362	9,961 51	17,376 35	27,337 86	1.28
Mountain Sanatorium	"	34,851	13,528 64	27,747 80	41,276 44	1.18
General Hospital	Kingston	52,490	31,380 76	42,717 67	74,098 43	1.41
Hotel Dieu Hospital	"	35,200	19,496 90	18,902 56	38,399 46	1.09
General Protestant Hospital	Ottawa	43,509	26,281 57	82,602 25	108,883 82	2.50
Roman Catholic Hospital	"	54,123	24,815 62	53,341 35	78,156 97	1.44
Maternity Hospital	"	6,954	4,668 36	11,027 70	15,696 06	2.25
St. Luke's General Hospital	"	36,383	24,779 27	43,671 75	68,451 02	1.88
Royal Sanatorium	"	21,326	8,644 33	24,925 33	33,569 66	1.57
General Hospital	London	65,699	48,957 20	93,987 80	142,945 00	2.17
St. Joseph's Hospital	"	26,414	17,068 66	31,481 08	48,549 74	1.83
Queen Alexandra Sanatorium	"	25,068	8,058 21	20,454 10	28,512 31	1.18
General and Marine Hospital	St. Catharines	15,854	10,194 66	17,874 66	28,069 32	1.70
Consumptive Sanatorium	"	2,676	1,283 75	2,816 69	4,100 44	1.53
General Hospital	Galt	11,215	7,292 40	11,823 20	19,115 60	1.70
General Hospital	Guelph	22,710	9,546 86	36,342 97	45,889 83	2.02
St. Joseph's Hospital	"	14,994	7,592 44	9,810 79	17,403 23	1.16
General Hospital	Pembroke	17,990	5,523 49	11,960 22	17,483 71	.97
Cottage Hospital	"	5,175	2,728 80	4,961 18	7,689 98	1.48
General Hospital	Mattawa	8,282	2,670 04	4,577 02	7 247 06	.87
General Hospital	Brantford	24,623	13,683 44	33,754 79	47,438 23	1.92
St. Joseph's Hospital	Port Arthur	15,490	7,100 28	21,015 87	28,116 15	1.81
Railway Marine & Gen. Hospital	"	8,611	4,068 32	9,423 52	13 491 84	1.56
General Hospital	Belleville	14,769	5,682 51	12,218 80	17,901 31	1.21
St. Vincent de Paul Hospital	Brockville	21,631	12,344 79	16,261 46	28,606 25	1.32
General Hospital	"	14,803	9,808 45	22,639 54	32,447 99	2.19
General and Marine Hospital	Collingwood	8,575	4,173 68	7,835 21	12,008 89	1.40
Nicholls' Hospital	Peterborough	15,024	7,693 29	18,920 48	26,613 77	1.77
St. Joseph's Hospital	"	10,290	4,064 44	8,090 71	12,155 15	1.18
Hotel Dieu Hospital	Windsor	16,297	12,331 66	14,012 21	26 343 87	1.61
St. Joseph's Hospital	Chatham	9,988	6,933 30	9,609 03	16,542 32	1.65
General Hospital	"	12,947	6,935 19	14,083 32	21,018 51	1.62
General Hospital	Stratford	12,310	6,642 00	14,339 31	20,981 31	1.70
Amasa Wood Hospital	St. Thomas	11,187	6,433 50	13,260 27	19,693 77	1.76
General and Marine Hospital	Owen Sound	10,422	6,663 94	10,045 64	16,709 58	1.60
St. Joseph's Hospital	Sudbury	25,898	11,896 91	18,419 55	30,316 46	1.17
General Hospital	Woodstock	9,118	5,711 97	8,587 45	14,299 42	1.56
Kitchener and Waterloo Hosp	Kitchener	12,356	6,033 66	15,632 85	21,666 51	1.75
General Hospital	Sarnia	12,307	6,024 73	12,626 66	18,651 39	1.51
Royal Victoria Hospital	Barrie	22,283	6,057 81	9,265 46	15,323 27	.68
Hotel Dieu Hospital	Cornwall	16,458	7,506 00	11,040 42	18,546 42	1.12
General Hospital	"	12,106	4,512 77	10 839 67	15,352 44	1.26
Muskoka Cottage Sanatorium	Gravenhurst	15,098	29,835 95	15,603 80	45,439 75	3.00
Muskoka Free Hosp. for Consump.	"	95,973	47,878 39	112,820 80	160,699 19	1.67
General Hospital	Kenora	2,850	1,541 98	4,641 17	6,183 15	2.17
St. Joseph's Hospital	"	5,058	1,663 10	4,156 38	5,819 48	1.15
General Hospital	Sault Ste. Marie	15,278	8,455 17	11,903 47	20,358 64	1.33
Victoria General Hospital	Renfrew	7,395	3,578 00	6,306 85	9,884 85	1.33
Ross Memorial Hospital	Lindsay	7,418	3,897 92	8,904 63	12,802 55	1.72
McKellar General Hospital	Fort William	22,305	10,455 09	26,185 62	36,640 71	1.64
General Hospital	Walkerton	3,712	2,613 18	5,608 19	8,221 37	2.21
Queen Victoria Hospital	North Bay	6 228	3,821 92	7,747 76	11,568 98	1.85
General Hospital	Midland	2,442	982 59	4,337 67	5,320 26	2.17
St. Francis' Hospital	Smith's Falls	7,696	4,411 76	4,706 44	9,118 20	1.18
King Edward Sanatorium	Weston	112,031	60,348 56	125,048 18	185,396 74	1.65
Free Hospital for Consumptives	"					
Queen Mary Hosp. for Children	"					
Victorian Hospital	Almonte	4,335	1,127 52	3,423 48	4,551 00	1.05
General Hospital	Niagara Falls	6,797	4,122 70	10,765 27	14,887 97	2.19
General Hospital	Wingham	2,338	1,259 96	4,086 88	5,346 84	2.28
General and Marine Hospital	Goderich	1,638	905 75	2,882 97	3,788 72	2.31
Lady Minto Hospital	New Liskeard	2,718	1,700 06	3,656 49	5,356 55	1.97
Royal Alexandra Hospital	Fergus	5,907	4,328 01	10,043 97	14,371 98	2.43
General Hospital	Parry Sound	5,521	2,629 37	5,428 00	8,057 37	1.45
General Hospital	Orillia	6,678	3,260 27	6,676 63	9,936 90	1.48
General Hospital	Welland	10,485	3,097 97	6,927 89	10,025 86	.95
General Hospital	Ingersoll	2,505	1,851 31	3,698 02	5,549 33	2.21
General Hospital	Kincardine	965	1,042 45	3,140 23	4,182 68	4.33
General Hospital	Cobourg	5,362	2,306 57	6,979 90	9,286 47	1.73
General Hospital	Oshawa	7,361	3,077 35	8,581 77	11,659 12	1.58
Charlotte E. Englehart Hospital	Petrolea	4,120	1,842 10	6,911 79	8,753 89	2.12

TABLE VI.—Showing the cost of maintaining the Hospitals, also the average daily cost per patient, etc.—Concluded.

Hospitals.	Location.	Collective days' stay, exclusive of infants under one year of age.	Cost of dietaries.	Salaries, fuel, light, medicine, bedding and all other expenditure on maintenance account	Total expenditure for maintenance.	Average cost of each patient per day.
			$ c.	$ c.	$ c.	$ c.
General Hospital	Penetang	1,799	1,227 86	2,478 69	3,706 55	2.06
General Hospital	Orangeville	1,662	1,751 94	2 980 63	4,732 57	2.84
General Hospital	Port Hope	3,903	1,191 71	5,421 97	6,613 68	1.69
General Hospital	Bowmanville	3,758	1,883 14	5,600 21	7,483 35	1.99
Mowat Sanatorium	Kingston	8,650	4,070 14	7,393 18	11 463 32	1.32
Public Hospital	Smith's Falls	8,213	4,390 73	19,597 48	23,988 21	2.92
Brant Sanatorium	Brantford	4,832	1,875 90	3,877 74	5,753 64	1.19
Preventorium	Toronto	13,977	3,698 65	8,060 80	11,759 45	.84
Essex Co. Tuberculosis Hospital	Kingsville	6,607	3,008 17	7,111 21	10,119 38	1.53
Providence Hospital	Haileybury	10,364	6,293 70	10,240 81	16.534 51	1.59
Lady Minto Hospital	Chapleau	1,820	1,413 42	3,525 66	4,939 08	2.71
General Hospital	Strathroy	2,778	1,356 35	3,741 02	5,097 37	1.83
Women's College Hospital	Toronto	5,737	2,643 91	7,918 92	10.562 83	1.84
Lady Minto Hospital	Cochrane	1 328	772 66	2,057 30	2.869 96	2.16
Misericordia Maternity Hospital	Ottawa	26,249	9,676 42	10,743 22	20,419 64	.77
St. Joseph's General Hospital	Parry Sound	6,107	1 479 60	2.665 08	4,144 68	.67
Totals for 1916		1,878,436	1,047,180 16	2,174,265 91	3,221,446 07	1.71
Totals for 1915		1,676,755	882,888 58	1,869,579 13	2,752,467 71	1.64

TABLE VII.—Showing the proportion of maintenance of Hospitals paid by the Government

Hospitals.	Location.	Revenues on maintenance account exclusive of Government grant.	Government grant in aid of maintenance.	Total revenue for maintenance.	Total expenditure for maintenance.	Percentage of Government grant to total expenditure for maintenance.
		$ c.	$ c.	$ c.	$ c.	
General Hospital	Toronto	391,872 38	28,410 41	420,282 79	420,952 75	6.7
Grace Hospital	"	58,699 06	3,896 91	62,595 97	62,584 06	6.2
Hospital for Sick Children	"	134,082 00	11,679 39	145,761 39	171,056 99	6.8
St. Michael's Hospital	"	137,007 45	16,169 42	153,176 87	154,008 61	10.4
Western Hospital	"	113,370 05	10,109 67	123,479 72	130,012 01	7.7
The Orthopedic Hospital	"	9,918 76	318 84	10,237 60	7,370 86	4.3
City Hospital	Hamilton	158,237 31	13,373 21	171,610 52	164,963 22	8.1
St. Joseph's Hospital	"	24,990 24	2,115 86	27,016 10	27,337 86	7.7
Mountain Sanatorium	"	24,009 13	13,597 29	37,599 42	41,276 44	32.9
General Hospital	Kingston	70,644 64	3,808 30	74,452 94	74,098 43	5.1
Hotel Dieu Hospital	"	32,826 79	4,164 29	36,991 08	38,399 46	10.8
General Protestant Hospital	Ottawa	103,307 73	4,394 95	107,702 68	108,883 82	4.4
Roman Catholic Hospital	"	73,374 33	6,023 59	79,397 92	78,156 97	7.7
Maternity Hospital	"	17,637 07	526 40	18,163 47	15,696 06	3.4
St. Luke's General Hospital	"	66,555 56	3,048 56	69,604 12	68,451 02	4.5
Royal Sanatorium	"	25,256 66	8,313 00	33,569 66	33,569 66	25.1
General Hospital	London	136,274 40	7,372 60	143,647 00	142,945 00	5.2
St. Joseph's Hospital	"	47,346 77	1,331 49	48,678 26	48,549 74	2.7
Queen Alexandra Sanatorium	"	25,033 99	8,232 00	33,265 99	28,519 31	28.9
General and Marine Hospital	St. Catharines	26,190 77	1,764 44	27,955 21	28,069 32	6.3
Consumptive Sanatorium	"	2,828 80	1,713 86	4,542 66	4,100 44	41.8
General Hospital	Galt	18,764 28	1,103 09	19,867 37	19,115 60	5.8
General Hospital	Guelph	42,664 34	3,212 39	45,876 73	45,889 93	7.0
St. Joseph's Hospital	"	15,467 50	2,030 29	17,497 79	17,403 23	11.1
General Hospital	Pembroke	13,385 31	2,490 19	15,875 50	17,483 71	14.8
Cottage Hospital	"	7,556 39	508 39	8,064 78	7,689 98	6.6
General Hospital	Mattawa	4,862 75	2,295 32	7,158 07	7,247 06	31.7
General Hospital	Brantford	42,301 95	2,902 46	45,204 41	47,488 93	6.1
St. Joseph's Hospital	Port Arthur	26,093 61	1,854 21	27,947 82	28,116 15	6.6
Railway, Mar, & Gen. Hosp.	"	23,092 02	1,574 14	24,666 16	13,491 84	11.7
General Hospital	Belleville	24,106 84	1,333 10	25,439 94	17,901 31	7.4
St. Vincent de Paul Hospital	Brockville	25,876 65	2,789 98	28,666 63	28,606 25	9.8
General Hospital	"	32,400 07	1,269 26	33,669 33	39,447 99	3.9
General and Marine Hospital	Collingwood	11,121 76	846 34	11,968 10	12 008 89	7.0
Nicholls' Hospital	Peterborough	30,751 92	1,592 40	32,344 32	26,613 77	6.0
St. Joseph's Hospital	"	10,723 81	1,082 50	11,806 31	12,155 15	8.9
Hotel Dieu Hospital	Windsor	24,304 18	1,906 76	26,210 94	26,343 87	7.2
St. Joseph's Hospital	Chatham	15,694 11	753 55	16,447 66	16,542 33	4.5
General Hospital	"	19,458 21	1,013 85	20,472 06	21,018 51	4.8
General Hospital	Stratford	23,347 80	1,117 18	24,464 98	20,981 31	5.3
Amasa Wood Hospital	St. Thomas	21,351 49	1,335 70	22,687 19	19,693 77	6.8
General and Marine Hospital	Owen Sound	17,036 73	652 80	17,689 33	16,709 58	3.9
St. Joseph's Hospital	Sudbury	28,694 68	3,565 75	32,260 43	30,316 46	11 7
General Hospital	Woodstock	15,550 20	892 37	16,442 57	14,299 42	6.2
Kitchener and Waterloo Hosp	Kitchener	20,513 00	967 30	21,480 30	21,666 51	4.5
General Hospital	Sarnia	17,667 35	1 150 66	18,818 01	18,651 39	6.2
Royal Victoria Hospital	Barrie	13 891 39	1 431 95	15,323 27	15,323 27	9.3
Hotel Dieu Hospital	Cornwall	15,767 20	2,401 38	18,168 58	18,516 42	12.9
General Hospital	"	18,699 42	1,384 21	20,083 63	15,352 44	9.0
Muskoka Cottage Sanatorium	Gravenhurst	44,126 14	.....	44,126 14	45,439 75	.....
Muskoka Free Hosp. for Con.	"	100,528 47	31,467 85	131,996 32	160,699 19	19.6
General Hospital	Kenora	5,396 58	748 30	6,144 88	6,183 15	12.1
St. Joseph's Hospital	"	5,313 95	534 06	5,848 01	5 819 48	9.2
General Hospital	Sault Ste. Marie	21,941 10	1,913 40	23,854 50	20,358 64	9.4
Victoria General Hospital	Renfrew	8,617 80	674 95	9,292 75	9,884 85	6.8
Ross Memorial Hospital	Lindsay	14,209 24	585 25	14,794 49	12,802 55	4.6
McKellar General Hosp.	Port William	36,069 68	2,425 89	38,495 57	36,640 71	6.6
General Hospital	Walkerton	7,900 67	483 94	8,384 61	8,221 37	5.9
Queen Victoria Hospital	North Bay	9,627 33	854 23	10,481 56	11,568 98	7.4
General Hospital	Midland	4,103 63	389 51	4,993 14	5,320 26	7.3
St. Francis' Hospital	Smith's Falls	8,416 15	708 27	9,124 42	9,118 20	7.8
King Edward Sanatorium	Weston					
Free Hospital for Consumptives	"	114,682 71	47,654 73	162,337 44	185,396 74	25.7
Queen Mary Hosp. for Children.	"					
Victorian Hospital	Almonte	4,473 00	270 23	4,743 23	4,551 00	5.9
General Hospital	Niagara Falls	14,874 29	1,170 88	16,045 17	14,887 97	7.9
General Hospital	Wingham	4,984 58	340 37	5,324 95	5,346 84	6.4
General and Marine Hospital	Goderich	3,268 00	364 15	3,632 15	3,788 79	9.6
Lady Minto Hospital	New Liskeard	4,557 53	733 96	5,291 49	6,356 55	13.7
Royal Alexandra Hospital	Fergus	13,721 33	966 97	14,688 30	14,371 98	6.7
General Hospital	Parry Sound	7,646 35	411 02	8,057 37	8,057 37	5.1
General Hospital	Orillia	9,640 03	1,219 66	10,859 69	9,936 90	12.3
General Hospital	Welland	15,761 97	1,634 33	17,396 30	10,025 86	16.3
General Hospital	Ingersoll	5,860 95	607 13	6,468 08	5,549 33	10.9
General Hospital	Kincardine	4,154 40	197 47	4,351 87	4,182 68	4.7
General Hospital	Cobourg	9,403 83	646 51	10,050 34	9,286 47	6.9
General Hospital	Oshawa	13,995 18	1,136 01	15,031 19	11,659 12	9.7
Charlotte E. Englehart Hosp	Petrolea	8,683 78	677 69	9,361 47	8,753 89	7.7

Table VII.—Showing the proportion of maintenance of Hospitals paid by the Government.—Concluded.

Hospitals.	Location.	Revenue on maintenance account exclusive of Government grant.	Government grant in aid of maintenance.	Total revenue for maintenance.	Total expenditure for maintenance.	Percentage of Government grant to total expenditure for maintenance.
		$ c.	$ c.	$ c.	$ c.	
General Hospital	Penetang	3,421 85	270 11	3,691 96	3,706 55	7.3
General Hospital	Orangeville	4,528 20	356 72	4,884 92	4,732 57	7.5
General Hospital	Port Hope	6,628 52	399 13	7,027 65	6,613 68	6.0
General Hospital	Bowmanville	7,684 53	673 52	8,358 05	7,483 35	8.1
Mowat Sanatorium	Kingston	11,127 97	2,826 86	13,954 83	11,463 32	24.7
Public Hospital	Smith's Falls	23,106 47	1,218 25	24,324 72	23,988 21	5.1
Brant Sanatorium	Brantford	4,645 39	1,446 86	6,092 25	5,753 64	25.1
Preventorium	Toronto	9,209 83	5,907 00	15,116 83	11,759 45	50.2
Essex Co. Tuberculosis Hospital	Kingsville	10,205 82	2,069 58	12,275 40	10,119 28	20.4
Providence Hospital	Haileybury	17,671 90	1,488 87	19,163 77	16,534 51	9.0
Lady Minto Hospital	Chapleau	4,824 65	350 40	5,175 05	4,939 08	7.1
General Hospital	Strathroy	7,377 98	486 86	7,864 84	5,097 37	9.6
Women's College Hospital	Toronto	10,598 39	.....	10,598 39	10,562 83	.....
Lady Minto Hospital	Cochrane	1,316 22	.....	1,316 22	2,869 96	.....
Misericordia Maternity Hosp	Ottawa	15,171 90	1 823 49	16,995 39	20,419 64	8.9
St. Joseph's General Hospital	Parry Sound	7,011 73	.....	7,011 73	4,144 68	.....
Totals for 1916	.....	2,906,904 80	313,956 21	3,220,861 01	3,221,446 07	9.7
Totals for 1915	.....	2,526,684 45	276,265 32	2 802,949 77	2,752,467 71	10.0

TABLE VIII.—Showing the comparative cost per patient daily in the different Hospitals in periods of five years.

Hospitals.	Location.	1905.	1910.	1915.	1916.
		$ c.	$ c.	$ c.	$ c.
General Hospital	Toronto	1.28	1.41	2.04	2.30
Grace Hospital	"	1.00	1.39	1.81	1.94
Hospital for Sick Children	"	1.25	1.53	2.26	2.35
St. Michael's Hospital	"	.90⅝	1.00	1.56	1.57
Western Hospital	"	.92	1.02	1.53	1.88
The Orthopedic Hospital	"	1.10½	1.39	1.64	1.35
City Hospital	Hamilton	1.14	1.37	1.53	1.63
St. Joseph's Hospital	"	.78	1.02	1.24	1.28
Mountain Sanatorium	"	.....	.99	1.07	1.18
General Hospital	Kingston	.79	.96	1.41	1.41
Hotel Dieu Hospital	"	.55	.65	1.03	1.09
General Protestant Hospital	Ottawa	1.29	1.28	1.76	2.50
Roman Catholic Hospital	"	.81	1.02	1.04	1.44
Maternity Hospital	"	2.03	1.97	2.24	2.25
St. Luke's General Hospital	"	.87	1.62	1.73	1.88
Royal Sanatorium	"	.....	1.84	1.49	1.57
General Hospital	London	1.26	1.62	2.10	2.17
St. Joseph's Hospital	"	1.23	1.24	1.66	1.83
Queen Alexandra Sanatorium	"	.....	2.11	1.10	1.13
General and Marine Hospital	St. Catharines	1.08	1.30	1.44	1.70
Consumptive Sanatorium	"	.....	1.14	.96	1.53
General Hospital	Galt	1.12½	1.55	1.49	1.70
General Hospital	Guelph	1.16	.95	1.43	2.02
St. Joseph's Hospital	"	.84	1.03	1.11	1.16
General Hospital	Pembroke	.53	.69	.97	.97
Cottage Hospital	"	.97	1.12	2.00	1.48
General Hospital	Mattawa	.96	.91	.61	.87
General Hospital	Brantford	.78	1.19	1.75	1.92
St. Joseph's Hospital	Port Arthur	1.09	1.35	1.20	1.81
Railway, Mar. & Gen. Hospital	"	.....	1.84	1.70	1.56
General Hospital	Belleville	1.63	1.09	1.21	1.21
St. Vincent de Paul Hospital	Brockville	.87	1.16	1.48	1.32
General Hospital	"	1.39	1.12	1.47	2.19
General and Marine Hospital	Collingwood	.96	1.01	1.34	1.40
Nicholls' Hospital	Peterborough	1.95	1.73	1.90	1.77
St. Joseph's Hospital	"	.47	.94	1.29	1.18
Hotel Dieu Hospital	Windsor	.76	1.04	1.76	1.61
St. Joseph's Hospital	Chatham	.72	.82	1.52	1.65
General Hospital	"	.87	1.00	1.61	1.62
General Hospital	Stratford	1.17	1.28	1.81	1.70
Amasa Wood Hospital	St. Thomas	1.92	1.97	2.15	1.76
General and Marine Hospital	Owen Sound	.89	1.11	1.87	1.60
St. Joseph's Hospital	Sudbury	1.08	1.06	1.23	1.17
General Hospital	Woodstock	1.87	1.34	1.42	1.56
Kitchener and Waterloo Hospital	Kitchener	1.64	1.64	1.53	1.75
General Hospital	Sarnia	1.63	1.59	1.28	1.51
Royal Victoria Hospital	Barrie	.93	1.14	1.31	.68
Hotel Dieu Hospital	Cornwall	.53	.75	.96	1.12
General Hospital	"	.74	.92	1.13	1.26
Muskoka Cottage Sanatorium	Gravenhurst	2.05	1.89	4.74	3.00
Muskoka Free Hosp. for Consumptives	"		1.14	1.62	1.67
General Hospital	Kenora	1.46	2.16	1.16	2.17
St. Joseph's Hospital	"	2.26	1.19	1.43	1.15
General Hospital	Sault St. Marie	.90	1.14	1.81	1.33
Victoria General Hospital	Renfrew	1.49	1.11	1.30	1.33
Ross Memorial Hospital	Lindsay	1.89	1.52	1.94	1.72
McKellar General Hospital	Fort William	1.08	1.66	1.90	1.64
General Hospital	Walkerton	2.66	2.27	1.58	2.21
Queen Victoria Hospital	North Bay	1.33	1.07	1.80	1.85
General Hospital	Midland	2.10	1.74	1.56	2.17
St. Francis' Hospital	Smith's Falls	.78	.72	1.37	1.18
King Edward Sanatorium	Weston	.....	1.47		
Free Hosp. for Consumptives	"	1.53	1.35	1.64	1.65
Queen Mary Hospital for Children	"	.....	.....		
Victorian Hospital	Almonte	.....	1.23	2.50	1.05
General Hospital	Niagara Falls	.....	1.54	2.01	2.19
General Hospital	Wingham	.....	1.79	2.28	2.28
General and Marine Hospital	Goderich	.....	1.73	2.05	2.31
Lady Minto Hospital	New Liskeard	.....	1.29	1.59	1.97
Royal Alexandra Hospital	Fergus	.....	1.52	2.16	2.43
General Hospital	Parry Sound	.....	1.61	1.58	1.45
General Hospital	Orillia	.....	1.12	1.40	1.48
General Hospital	Welland	.....	1.82	1.27	.95
General Hospital	Ingersoll	.....	2.19	1.74	2.21
General Hospital	Kincardine	.....	2.35	3.83	4.33
Cottage Hospital	Cobourg	.....	1.66	1.73	1.73
General Hospital	Oshawa	.....	8.23	1.46	1.58
Charlotte E. Englehart Hosp.	Petrolea	.....	.....	2.25	2.12
General Hospital	Penetang	.....	.....	2.47	2.06
General Hospital	Orangeville	.....	.....	2.00	2.84
General Hospital	Port Hope	.....	.....	2.21	1.69

TABLE VIII.—Showing the comparative cost per patient daily in the different Hospitals in periods of five years.—Concluded.

Hospitals.	Location.	1905	1910	1915	1918
		$ c.	$ c.	$ c.	$ c.
General Hospital	Bowmanville..	.....	.....	1.73	1.99
Mowat Sanatorium	Kingston.....	.....	.....	1.26	1.32
Public Hospital	Smith's Falls..	.....	.....	2.04	2.92
Brant Sanatorium	Brantford	.....	.....	1.90	1.19
Preventorium	Toronto	.....	.....	.75	.84
Essex Co. Tuberculosis Hosp.	Kingsville	.....	.....	1.29	1.53
Providence Hospital	Haileybury	.....	.....	1.97	1.59
Lady Minto Hospital	Chapleau	.....	.....	2.67	2.71
General Hospital	Strathroy	.....	.....	1.77	1.83
Women's College Hospital	Toronto.....	.....	.....	.....	1.84
Lady Minto Hospital	Cochrane.....	.....	.....	.....	2 16
Misericordia Maternity Hospital	Ottawa.....	.....	.....	.....	.77
St. Joseph's General Hospital	Parry Sound...	.....	.....	.....	.67
Averages	.....	1.13	1.26	1.64	1.71

SEPARATE REPORTS

GENERAL HOSPITAL, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment in all departments of the Hospital, 1st October, 1915	521
Admitted	9,339
Births in the Hospital	859
Total number under treatment	10,719
Discharges, including infants.	9,639
Died	609
Under treatment, 30th September, 1916	471
Total	10,719

Sex.

Male	5,372
Female	5,347
	10,719

Revenue.

From the Province of Ontario	$28,410 41
From the City of Toronto, in payment of patients' maintenance	96,667 78
From the County of York, in payment of patients' maintenance	3,160 60
From other municipalities of the Province	2,909 00
From paying patients themselves	205,559 79
Income for property belonging to Hospital Trust	37,779 48
Subscriptions, donations, and bequests of private individuals	10,897 70
From all other sources not above enumerated	34,898 03
Total	$420,282 79

Expenditures.

Butchers' meat, poultry and fish	$40,969 34
Butter and eggs	22,579 28
Flour, bread and meal	7,675 92
Milk and cream	20,086 42
Tea and coffee	4,288 44
Potatoes and other vegetables	17,585 59
Groceries and provisions not enumerated	21,409 97
Drugs and medicines	14,554 12
Radiographic department	2,166 17
Medical and surgical appliances, bandages, etc.	6,597 40
Surgical instruments, ordinary, etc.	6,044 18
Beer, wine and spirits	617 65
Bedding, napery and general house furnishings	16,146 01
Clothing, etc., for patients	1,493 48
Laundry, brooms, brushes, mops, soap, and cleaning appliances	21,456 61
Fuel, power-house and wages.	44,274 54
Light: Gas, oil, electric light	4,055 07
Water supply	1,460 28
Nurses' uniforms and medals	1,230 94
Nurses' text-book	.....
Gardens and grounds	2,583 09
Salaries and wages	121,034 18
Postage and street car fares.	164 70
Retiring allowance	700 00
Contingencies, miscellaneous expenses	.....
Repairs, ordinary	8,277 99
Telephones	3,127 13
Interest on debts and insurance	1,957 79
Printing, postage, stationery, annual report, advertising..	6,215 35
Taxes and insurance	2,690 10
Bank overdraft	19,511 01
Total	$420,952 75
Government grant for 1916...	$25,555 24

GRACE HOSPITAL, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment in the Hospital, 1st October, 1915	108
Admitted	1,827
Births in the Hospital	356
Total number under treatment	2,291

GRACE HOSPITAL, TORONTO.—*Continued.*

Discharges, including infants	2,095
Died	92
Under treatment, 30th September, 1916	104
	2,291

Sex.

Male	868
Female	1,423
	2,291

Revenue.

From the Government of Ontario	$3,896 91
From the City of Toronto in payment of patients' maintenance	13,937 59
From the County of York	411 00
From other municipalities	213 00
From paying patients themselves	38,739 85
Income from endowments, etc.	2,837 48
Subscriptions, donations and bequests of private individuals	.....
From all sources not above enumerated	2,560 14
Total	$62,595 97

Expenditures.

Butchers' meat	$4,105 98
Butter and eggs	2,842 76
Flour, bread and meal	1,519 27
Milk	2,908 93
Tea and coffee	589 28
Potatoes and other vegetables	1,701 95
Groceries and provisions not enumerated	3,173 36
Drugs and medicines	1,886 40
Medical and surgical appliances	4,124 28
Surgical instruments	333 29
Beer, wine and spirits	64 60
Bedding, napery and general house furnishings	3,071 88
Brooms, brushes, mops, soap, and cleaning appliances	1,492 61
Fuel	5,240 54
Light: Electric, oil and candles	876 51
Water supply	462 98
Ice	484 54
Salaries and wages	14,724 36
Taxes and insurance	284 40
Contingencies	1,304 77
Repairs, ordinary	3,919 46
Advertising, stationery, etc.	1,033 56
Clothing for patients	341 75
Bank overdraft and interest	6,096 60
	$62,584 06
Government grant for 1916	$4,044 24

HOSPITAL FOR SICK CHILDREN, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Under treatment, 1st October, 1915	207
Admitted	2,838
Total number under treatment	3,045
Discharged	2,467
Died	370
Under treatment, 30th September, 1916	208
	3,045

Sex.

Male	1,816
Female	1,229
	3,045

Revenue.

From the Province of Ontario	$11,679 39
From the City of Toronto	53,018 64
From municipalities	9,909 10
From patients themselves for maintenance and treatment	25,353 23
From property belonging to Hospital	1,841 00
From subscriptions, donations and bequests from private individuals	38,043 17
From all other sources not enumerated	5,916 86
Total	$145,761 39

Expenditures.

Butchers' meat, game and fish	$7,227 74
Butter and eggs	5,425 52
Flour, bread and meal	2,293 49
Milk	9,424 87
Tea and coffee	709 48
Potatoes and other vegetables	3,085 07
Groceries and provisions not enumerated	7,655 84
Drugs and medicines	5,501 05
Medical and surgical appliances	8,667 52
Surgical instruments	446 74
Bedding, napery and general house furnishings	1,455 00

HOSPITAL FOR SICK CHILDREN, TORONTO.—*Continued.*

Brooms, brushes, mops, soap and cleaning appliances	3,241 87
Fuel	19,628 38
Light: Electric, gas, oil, candles	1,993 07
Water supply	783 47
Clothing for patients, including boots, shoes and linen	2,487 92
Ice	977 87
Salaries and wages	70,775 38
Insurance and taxes	1,714 47
Contingencies	2,656 06
Repairs, ordinary	4,769 92
Printing, stationery, etc.	8,055 83
Telephones and electricity	2,080 43
Interest account	.....
Total	$171,056 99
Government grant for 1916	$12,377 49

ST. MICHAEL'S HOSPITAL, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	302
Admitted	4,404
Births in the Hospital	323
Total number under treatment	5,029
Discharged	4,466
Died	317
Under treatment, 30th September, 1916	246
	5,029

Sex.

Male	2,612
Female	2,417
	5,029

Revenue.

From the Government of Ontario	$16,169 42
From the City of Toronto in payment of patients' maintenance	57,731 00
From the County of York	372 00
From other municipalities	348 00
From paying patients themselves	63,658 56
Subscriptions, donations and bequests of private individuals	5,848 65
From all other sources not above enumerated	9,049 24
Total	$153,176 87

Expenditures.

Butchers' meat, poultry and fish	$17,770 83
Butter and eggs	10,635 32
Flour, bread and meal	4,863 03
Milk	9,990 43
Tea and coffee	2,334 49
Potatoes, other vegetables and fruit	7,270 11
Groceries and provisions not enumerated	8,431 88
Drugs and medicines	10,371 85
Medical and surgical appliances	9,661 26
Surgical instruments	2,702 75
Beer, wine and spirits	507 33
Bedding, napery and general house furnishings	4,687 49
Brooms, brushes, mops, soap and cleaning appliances	4,019 71
Fuel	9,243 32
Electric light, gas, oil, candles	5,239 59
Water supply	657 80
Ice	.....
Salaries and wages	27,919 00
Taxes and insurance	1,234 65
Contingencies	6,018 96
Repairs, ordinary	6,945 37
Telephone service	468 84
Advertising, printing, stationery, etc.	2,755 01
Clothing for patients, including boots and shoes	279 59
Total	$154,008 61
Government grant for 1916	$16,151 76

WESTERN HOSPITAL, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	209
Admitted	3,511
Births in Hospital	386
Total number under treatment	4,106
Discharged	3,676
Died	269
Under treatment, 30th September, 1916	161
	4,106

Sex.

Male	1,800
Female	2,306
	4,106

Revenue.

From the Province of Ontario	$10,109 67
From the City of Toronto	32,328 80
From the patients for maintenance and treatment	72,570 18
From subscriptions, donations and bequests from private individuals	1,132 90
From other sources	4,829 67
From other municipalities	2,508 50
Total	$123,479 72

Expenditures.

Butchers' meat	$8,182 08
Butter and eggs	9,945 08
Flour, bread and meal	1,833 84
Milk	4,353 38
Tea and coffee	722 87
Potatoes and other vegetables	3,630 57
Groceries and provisions not enumerated	7,337 29
Drugs and medicines	7,602 23
Medical and surgical appliances and instruments	10,163 32
Telephones	875 00
Beer, wine and spirits	703 62
Bedding, napery and general house furnishinigs	5,646 70
Brooms, brushes, mops, soap and cleaning appliances	2,685 34
Fuel	6,041 53
Light: Gas, oil and candles	2,651 12
Water	816 23
Ice supply	706 64
Salaries and wages	36,199 04
Taxes and insurance	1,296 71
Contingencies—interest	9,264 57
Repairs, ordinary	4,516 90
Clothing for patients	880 62
Printing, postage, etc.	2,555 66
Coffins and funerals	1,401 67
Total	$130,012 01
Government grant for 1916	$8,659 26

THE ORTHOPEDIC HOSPITAL, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	14
Admitted	216
Total number under treatment	230
Discharges	212
Died	4
Under treatment, 30th September, 1916	14
	230

Sex.

Male	112
Female	118
	230

Revenue.

From the Government of Ontario	$318 84
Income from endowments, etc., or other property belonging to the Hospital	138 24
From paying patients themselves	9,770 52
Subscriptions, donations, and bequests of private individuals	10 00
From all other sources not above enumerated	.....
Total	$10,237 60

Expenditures.

Butchers' meat	$426 08
Butter and eggs	379 61

THE ORTHOPEDIC HOSPITAL, TORONTO.—*Continued.*

Flour, bread and meal	199 36	Electric light, gas, oil and candles	215 66
Milk	438 43	Water supply	30 20
Tea and coffee	34 58	Ice	56 39
Potatoes and other vegetables	262 36	Salaries and wages	2,828 92
Groceries and provisions not enumerated	581 55	Taxes and insurance	54 30
Drugs and medicines	54 44	Repairs, ordinary	63 92
Medical and surgical appliances, surgical instruments.	350 81	Gymnasium and sundries	.....
Bedding, napery and general house furnishings	99 42	Sundries	697 30
Brooms, brushes, mops, soap and cleaning appliances	55 17	Clothing for patients	8 60
Fuel	533 76	Total	$7,370 86
		Government grant for 1916	$318 99

CITY HOSPITAL, HAMILTON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	258
Admitted	6,516
Births in hospital	324
Total number under treatment	7,098
Discharged	6,343
Died	445
Under treatment, 30th September, 1916	310
	7,098

Sex.

Male	3,784
Female	3,314
	7,098

Revenue.

From the Province of Ontario.	$13,373 21
From the City of Hamilton	93,582 22
From the County of Wentworth	.....
From patients for maintenance and treatment	64,596 31
From other sources	58 78
Total	$171,610 52

Expenditures.

Butchers' meat	$14,645 49
Butter and eggs	11,489 89
Flour, bread and meal	3,661 66
Milk	7,931 37
Tea and coffee	1,764 34
Potatoes and other vegetables	2,682 38
Groceries and provisions not enumerated	12,578 65
Drugs and medicines	6,704 24
Medical and surgical appliances	7,819 50
Laboratory	1,501 99
Beer, wine and spirits	220 63
Bedding, napery and general house furnishings	10,413 84
Brooms, brushes, mops, soap and cleaning appliances	2,092 55
Fuel	16,223 95
Electric light, gas, oil and candles	2,531 82
Water supply	2,164 09
Ice supply	740 70
Salaries and wages	49,151 28
Insurance and taxes	195 10
Contingencies	2,286 74
Repairs, ordinary	2,395 26
Clothing for patients	188 67
X-ray	2,123 99
Merchandise, printing and postage	1,085 51
Telephones and telegraphs	565 32
Hardware and paints	1,135 34
Night watchmen, services	668 92
Total	$164,963 22
Government grant for 1916	$15,209 41

ST. JOSEPH'S HOSPITAL, HAMILTON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	58
Admitted	1,271
Number of births	145
Total number under treatment	1,474
Discharged	1,347
Died	62
Under treatment, 30th September, 1916	65
	1,474

Sex.

Male	613
Female	861
	1,474

Revenue.

From the Province of Ontario.	$2,115 86
From the City of Hamilton	2,512 55
Income from endowments, investments, etc.	585 00
From paying patients themselves	21,552 83
Subscriptions, donations and bequests in cash	125 00
From all other sources	124 86
Total	$27,016 10

Expenditures.

Butchers' meat and fish	$3,430 00
Butter and eggs	1,687 43
Flour, bread and meal	888 50
Milk	1,408 24
Tea and coffee	301 71
Potatoes and other vegetables	684 84
Groceries and other provisions not enumerated	1,560 79
Drugs and medicines	1,271 44
Medical and surgical appliances	1,239 79
Surgical instruments	395 17
Beer, wine and spirits	220 17
Bedding, etc.	3,560 91
Brooms, brushes, mops, soap and cleaning appliances	435 70
Fuel	2,771 68
Electric light, gas, oil and candles	768 90
Water supply	188 48
Clothing for patients, including boots and shoes	323 14
Ice supply	182 60
Salaries and wages	2,830 65
Taxes, insurance and interest.	1,565 89
Contingencies	500 42
Repairs, ordinary	847 83
Printing, stationery, etc.	273 58
Coffins and funerals	.....
Total	$27,337 86
Government grant for 1916	$2,800 24

GENERAL HOSPITAL, KINGSTON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	127
Admitted	3,800
Births in Hospital	89
Total number under treatment	4,016
Discharged	3,773
Died	116
Under treatment, 30th September, 1916	127
	4,016

Sex.

Male	2,553
Female	1,463
	4,016

Revenue.

From the Province of Ontario	$3,808 30
From the City of Kingston	7,500 00
From the County of Frontenac	1,800 00
From other municipalities in the Province	1,125 00
From paying patients themselves for treatment	55,583 48
Subscriptions, donations and bequests	2,650 46
From all other sources not enumerated	1,985 70
Total	$74,452 94

Expenditures.

Butchers' meat	$7,008 89
Butter and eggs	5,829 00
Flour, bread and meal	1,892 60
Milk	3,774 98

GENERAL HOSPITAL, KINGSTON.—*Continued.*

Tea and coffee	872 06
Potatoes and other vegetables	2,111 79
Groceries and provisions not enumerated	9,891 44
Drugs and medicines	3,909 60
Surgical instruments and appliances	5,750 40
Beer, wine and spirits	285 30
Bedding, napery and general house furnishings	1,595 48
Brooms, brushes, mops, soap and cleaning appliances	838 26
Fuel	4,786 40
Electric light, gas, oil and candles	3,149 17
Water supply	413 31
Ice	150 00
Salaries and wages	11,239 42
Insurance and taxes	739 48
Contingencies	6,397 92
Repairs, ordinary	2,458 69
Printing, stationery, etc.	960 99
Clothing for patients	43 25
Total	$74,098 43
Government grant for 1916	$3,130 83

HOTEL DIEU HOSPITAL, KINGSTON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	85
Admitted	2,290
Births in Hospital	73
Total number under treatment	2,448
Discharged	2,261
Died	96
Under treatment, 30th September, 1916	91
	2,448

Sex

Male	1,332
Female	1,116
	2,448

Revenue.

From the Province of Ontario	$4,164 29
From the City of Kingston	3,000 00
From the County of Frontenac	1,250 00
From other municipalities	210 00
From patients themselves for maintenance and treatment.	25,702 69
Subscriptions, donations and bequests	2,664 10
From other sources not enumerated	.....
Total	$36,991 08

Expenditures.

Butchers' meat	$5,712 87
Butter and eggs	3,911 36
Flour, bread and meal	1,473 55
Milk	2,613 65
Tea and coffee	992 57
Potatoes and other vegetables	1,056 87
Groceries and provisions not enumerated	3,736 03
Drugs and medicines	1,639 01
Medical and surgical appliances	1,722 76
Surgical instruments	28 45
Beer, wine and spirits	151 60
Bedding, napery and general house furnishings	3,133 30
Brooms, brushes, mops, soap and cleaning appliances	612 73
Fuel	3,366 85
Light: gas, oil and candles	1,693 82
Water supply	430 35
Ice	130 00
Salaries and wages	2,430 78
Taxes and insurance	237 00
Hay and straw	113 50
Contingencies	1,190 76
Repairs, ordinary	1,741 15
Printing, stationery, etc.	222 00
Clothing for patients	58 50
Total	$38,399 46
Government grant for 1916	$4,155 00

GENERAL PROTESTANT HOSPITAL, OTTAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	114
Admitted	2,825
Births in the Hospital	5
Total number under treatment	2,944
Discharged	2,704
Died	123
Under treatment, 30th September, 1916	117
	2,944

Sex

Male	1,643
Female	1,301
	2,944

Revenue.

From the Province of Ontario	$4,394 95
From the City of Ottawa	16,243 80
From the County of Carleton	1,000 00
From other municipalities	525 00
From patients themselves for maintenance and treatment	58,308 99
Income from endowments, investments, etc.	.....
Subscriptions, donations and bequests of private individuals	5,015 75
From other sources not enumerated	22,214 19
Total	$107,702 68

Expenditures.

Butchers' meat	$6,702 17
Butter and eggs	4,328 04
Flour, bread and meal	1,965 08
Milk	4,392 39
Tea and coffee	676 38
Potatoes and other vegetables	1,380 20
Groceries and provisions not enumerated	6,837 31
Drugs and medicines	5,086 45
Medical and surgical appliances	4,078 37
Surgical instruments	396 30
Beer, wine and spirits	205 49
Bedding, napery and general house furnishings	2,847 89
Brooms, brushes, mops, soap and cleaning appliances	1,525 46
Fuel	6,551 88
Electric light, gas, oil, candles	639 07
Water supply	659 28
Clothing for patients, including boots and shoes	118 70
Ice	144 54
Salaries and wages	25,314 20
Taxes and insurance	1,234 13
Contingencies	2,527 23
Repairs, ordinary	3,526 40
Interest	446 66
Printing, stationery, etc.	1,106 61
Bank overdraft	26,193 59
Total	$108,883 82
Government grant for 1916	$3,627 58

ROMAN CATHOLIC HOSPITAL, OTTAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	150
Admitted	3,103
Total number under treatment	3,253
Discharged	2,991
Died	118
Under treatment, 30th September, 1916	144
	3,253

Sex.

Male	1,725
Female	1,528
	3,253

Revenue.

From the Province of Ontario	$6,023 59
From the City of Ottawa	18,628 30
From the County of Carleton	300 00
From other municipalities	262 00
From patients themselves for maintenance and treatment	47,758 78

ROMAN CATHOLIC HOSPITAL, OTTAWA.—*Continued.*

Income from property	.....
Subscriptions, donations and bequests of private individuals	2,123 50
From all other sources not enumerated	4,301 75
Total	$79,397 92

Expenditures.

Butchers' meat	$5,129 17
Butter and eggs	3,967 65
Flour, bread and meal	2,513 65
Milk	3,801 83
Tea and coffee	904 86
Potatoes and other vegetables	1,909 28
Groceries and provisions not enumerated	6,589 18
Drugs and medicines	3,895 76
Medical and surgical appliances	3,949 00
Surgical instruments	1,570 14
Beer, wine and spirits	337 27
Bedding, napery and general house furnishings	2,236 33
Brooms, brushes, mops, soap and cleaning appliances	1,582 63
Fuel	5,592 98
Electric light, gas, oil, candles	3,058 51
Water supply	869 88
Clothing for patients, including boots and shoes	2,174 35
Ice	350 00
Salaries and wages	10,037 62
Taxes and insurance	1,873 85
Contingencies	1,454 29
Repairs, ordinary	8,695 29
Printing, stationery, etc.	1,762 54
Telephones	352 32
Radiographic Dept.	3,548 59
Total	$78,156 97
Government grant for 1916	$5,558 48

MATERNITY HOSPITAL, OTTAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	41
Admitted	555
Number of births	524
Total number under treatment	1,120
Discharged	1,064
Died	22
Under treatment, 30th September, 1916	34
	1,120

Sex.

Male	260
Female	860
	1,120

Revenue.

From the Province of Ontario	$526 40
From the City of Ottawa	1,600 00
From the County of Carleton.	75 00
From paying patients themselves	14,516 94
From subscriptions and donations	1,445 13
From other sources	.....
Total	$18,163 47

Expenditures.

Butchers' meat	$1,446 55
Butter and eggs	1,037 84
Flour, bread and meal	311 32
Milk	580 89
Tea and coffee	176 30
Potatoes and other vegetables	593 82
Groceries and provisions not enumerated	521 64
Drugs and medicines	645 48
Medical and surgical appliances	190 29
Surgical dressings	1,027 21
Bedding, napery and general house furnishings	324 52
Brooms, brushes, mops, soaps and cleaning appliances	168 21
Fuel	661 21
Gas, oil, candles and electric light	479 55
Water supply	263 37
Beer, wine and spirits	.....
Ice	116 28
Salaries and wages	5,076 40
Stationery, printing, etc.	163 39
Contingencies	346 43
Repairs, ordinary	961 44
Taxes and insurance	162 16
Laundry	441 76
Total	$15,696 06
Government grant for 1916	$502 80

ST. LUKE'S GENERAL HOSPITAL, OTTAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	93
Admitted	2,559
Total number under treatment	2,652
Discharged	2,481
Died	73
Under treatment, 30th September, 1916	98
	2,652

Sex.

Male	1,957
Female	695
	2,652

Revenue.

From the Province of Ontario	$3,048 56
From the City of Ottawa	9,790 00
From the County of Carleton	200 00
From paying patients themselves	51,775 53
Income from investments	.....
From subscriptions and donations	226 54
From other sources	4,563 49
Total	$69,604 12

Expenditures.

Butchers' meat	$7,940 36
Butter and eggs	5,530 31
Flour, bread and meal	1,732 09
Milk	3,440 17
Tea and coffee	779 48
Potatoes and other vegetables	1,361 16
Groceries and provisions not enumerated	3,995 70
Drugs and medicines	2,378 83
Medical and surgical appliances	2,945 18
Surgical instruments	.....
Beer, wine and spirits	259 35
Bedding, napery and general house furnshings	2,051 38
Brooms, brushes, mops, soap and cleaning appliances	766 88
Fuel	5,029 22
Gas, oil, candles and electric light	2,128 56
Ice	.....
Salaries and wages	17,665 23
Taxes, insurance and interest	1,412 00
Contingencies	2,995 62
Repairs, ordinary	5,486 05
Printing and postage	553 45
Clothing for patients	.....
Total	$68,451 02
Government grant for 1916	$2,224 41

GENERAL HOSPITAL, LONDON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	195
Admitted	3,468
Births in Hospital	259
Total number under treatment	3,922
Discharged	3,495
Died	219
Under treatment, 30th September, 1916	208
	3,922

Sex.

Male	1,814
Female	2,108
	3,922

Revenue.

From the Province of Ontario	7,372 60
From the City of London	74,680 09
From the County of Middlesex, in payment of patients	2,161 42
From paying patients themselves	54,860 43
From income from property or investments	537 17
Subscriptions, donations and bequests	4,035 29
	$143,647 00

Expenditures.

Butchers' meat	$14,773 38
Butter and eggs	10,697 37
Flour, bread and meal	2,826 33
Milk	6,269 93
Tea and coffee	1,486 44
Potatoes and other vegetables	2,779 92

GENERAL HOSPITAL, LONDON.—*Continued.*

Groceries and provisions not enumerated	10,123 83
Drugs and medicines	7,233 66
Surgical instruments	677 89
Medical and surgical appliances	4,919 54
Beer, wine and spirits	231 50
Bedding, napery and general house furnishings	6,447 40
Brooms, brushes, mops, soap and cleaning appliances	838 25
Fuel	13,332 06
Light: Gas, oil, and candles	2,610 70
Water	467 22
Ice	940 80
Salaries and wages	40,447 57
Insurance	350 72
Contingencies	3,042 08
Repairs, ordinary	4,781 01
Printing and stationery	881 83
Bank overdraft	58 87
Laundry	6,726 70
Total	$142,945 00
Government grant for 1916	$8,478 31

ST. JOSEPH'S HOSPITAL, LONDON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	66
Admitted	1,393
Births in Hospital	170
Total number under treatment	1,629
Discharged	1,473
Died	65
Under treatment, 30th September, 1916	91
	1,629

Sex.

Male	615
Female	1,014
	1,629

Revenue.

From the Province of Ontario	$1,331 49
From other municipalities	3,280 50
From paying patients	42,436 87
Subscriptions, donations, etc.	.....
Other sources	1,629 40
	$48,678 26

Expenditures.

Butchers' meat	$4,300 82
Butter and eggs	4,200 82
Flour, bread and meal	1,961 33
Milk	2,925 61
Tea and coffee	595 19
Potatoes and other vegetables	894 79
Groceries and provisions not enumerated	3,225 33
Drugs and medicines	2,145 75
Medical and surgical appliances	1,759 14
Beer, wine and spirits	220 75
Bedding, napery and general house furnishings	3,544 43
Brooms, brushes, mops, soap and cleaning appliances	528 37
Fuel	4,013 86
Light: Gas, oil and candles	911 26
Water	264 10
Telephone	124 20
Ice	205 01
Salaries and wages	7,516 83
Insurance, taxes and interest	6,608 63
Contingencies	524 53
Repairs, ordinary	1,896 66
Printing, stationery, postage, etc.	182 33
Total	$48,549 74
Government grant for 1916	$1,689 50

GENERAL AND MARINE HOSPITAL, ST. CATHARINES.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	57
Admitted	1,089
Births in Hospital	178
Total number under treatment	1,324
Discharged	1,186
Died	89
Under treatment, 30th September, 1916	49
	1,324

GENERAL AND MARINE HOSPITAL, ST. CATHARINES.—*Continued.*

Sex.

Male	698
Female	626
	1,324

Revenue.

From the Province of Ontario	$1,764 44
From the City of St. Catharines	.....
From the County of Lincoln	2,194 00
From other municipalities	.....
From patients themselves for maintenance and treatment	20,732 40
From endowments, investments, or other property belonging to the Hospital	45 00
From subscriptions, bequests and donations of private persons	3,059 00
From all other sources not above enumerated	160 37
Total	$27,955 21

Expenditures.

Butchers' meat and fish	$2,699 46
Flour, bread and meal	1,772 57
Butter and eggs	661 87
Milk	1,273 20
Tea and coffee	488 95
Potatoes and other vegetables and fruit	643 98
Groceries and provisions not enumerated	2,654 63
Drugs and medicines	1,009 04
Medical and surgical appliances	1,097 23
Surgical instruments	167 52
Beer, wine and spirits	36 25
Bedding, napery and general house furnishings	1,221 50
Brooms, brushes, mops, soap and cleaning appliances	624 38
Fuel	2,763 18
Electric light, gas, oil, candles	307 68
Water supply	95 40
Ice	401 95
Salaries and wages	7,690 45
Taxes and insurance	316 41
Contingencies	373 86
Repairs, ordinary	1,574 09
Printing, stationery, etc.	195 72
Total	$28,069 32
Government grant for 1916	$1,555 66

GALT HOSPITAL, GALT.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	29
Admitted	806
Number of births in the Institution	93
Total number under treatment	928
Discharged	832
Died	59
Under treatment, 30th September, 1916	37
	928

Sex.

Male	455
Female	473
	928

Revenue.

From the Province of Ontario	$1,103 09
From the Town of Galt	2,500 00
From the County of Waterloo	2,000 00
From other municipalities	100 00
From paying patients themselves	13,712 28
Income from endowments, investments, etc.	452 00
From subscriptions, bequests, and donations of private individuals	.....
From other sources	.....
Total	$19,867 37

Expenditures.

Butchers' meat	$1,900 34
Butter and eggs	617 33
Flour, bread and meal	403 20
Milk	792 25
Tea and coffee	83 50
Potatoes and other vegetables	291 30
Groceries and provisions not enumerated	3,204 48
Drugs and medicines	956 62
Medical and surgical appliances	819 29
Beer, wine and spirits	42 75
Bedding, napery and general house furnishings	807 30
Brooms, brushes, mops, soap and cleaning appliances	384 59
Fuel	1,772 60
Electric light, gas, oil, candles	222 72

GALT HOSPITAL, GALT.—*Continued.*

Water supply	269 76
Ice	86 30
Salaries and wages	5,326 18
Taxes and insurance	31 75
Contingencies	298 02
Repairs, ordinary	680 88
Printing, stationery, etc.	40 07
Telephone	84 37
Total	$19,115 60
Government grant for 1916	$1,199 44

GENERAL HOSPITAL, GUELPH.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	54
Admitted	1,334
Births in Hospital	82
Total number under treatment	1,470
Discharged	1,329
Died	70
Under treatment, 30th September, 1916	71
	1,470

Sex.

Male	805
Female	665
	1,470

Revenue.

Received from the Province of Ontario	$3,212 39
From the City of Guelph	2,989 85
From the County of Wellington	437 00
From other municipalities	.....
From paying patients	31,294 30
Subscriptions, donations, etc.	226 00
From other sources not enumerated	7,717 19
Total	$45,876 73

Expenditures.

Butchers' meat	$3,245 20
Butter and eggs	2,690 84
Flour, bread and meal	974 51
Milk	46 57
Tea and coffee	267 69
Potatoes and other vegetables	579 59
Groceries and provisions not enumerated	1,742 46
Drugs and medicines, surgical instruments and appliances	2,348 18
Beer, wine and spirits	89 60
Bedding, napery and general house furnishings	1,419 79
Brooms, brushes, mops, etc.	1,367 83
Fuel	3,559 24
Electric light, gas, oil, candles	1,257 93
Water supply	199 32
Hay and straw	543 99
Ice	131 00
Salaries and wages	9,366 92
Taxes, insurance and interest	2,122 36
Repairs, ordinary	4,297 01
Contingencies	6,552 76
Printing, stationery, etc.	377 52
Grounds	85 66
Bank overdraft	2,623 86
Total	$45,889 83
Government aid for 1916	$2,951 14

ST. JOSEPH'S HOSPITAL, GUELPH.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	46
Admitted	760
Births in Hospital	38
Total number under treatment	844
Discharged	784
Died	26
Under treatment, 30th September, 1916	34
	844

ST. JOSEPH'S HOSPITAL, GUELPH.—*Continued.*

Sex.

Male	328
Female	516
	844

Revenue.

From the Province of Ontario	$2,030 29
From the City of Guelph	1,769 20
From the County of Wellington	1,457 20
From other municipalities of the Province	.....
From paying patients	11,153 50
Subscriptions, donations, etc.	370 00
Other sources	717 60
Total	$17,497 79

Expenditures.

Butchers' meat and fish	$2,430 81
Butter and eggs	1,037 25
Flour, bread and meal	1,105 17
Milk	.....
Tea and coffee	500 09
Potatoes and other vegetables	.....
Groceries and provisions not enumerated	2,519 12
Drugs and medicines	833 70
Medical and surgical appliances	649 25
Surgical instruments	59 49
Beer, wine and spirits	80 75
Bedding, napery and general furnishings	1,380 28
Brooms, brushes, mops, soap and cleaning appliances	432 81
Fuel	1,965 78
Electric light, gas, oil, candles	439 32
Water supply	55 00
Salaries and wages	1,723 76
Taxes, interest and insurance	549 00
Contingencies	742 24
Repairs, ordinary	631 60
Ice supply	.....
Telephone	158 00
Printing, stationery, etc.	109 81
Total	$17,403 23

Government aid for 1916 .... $2,208 82

GENERAL HOSPITAL, PEMBROKE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	45
Admitted	826
Total number under treatment	871
Discharged	786
Died	42
Under treatment, 30th September, 1916	43
	871

Sex.

Male	430
Female	441
	871

Revenue.

From the Province of Ontario	$2,490 19
From the County of Renfrew	982 75
From Town of Pembroke	750 00
From other municipalities	464 95
From patients themselves	8,818 64
From subscriptions, bequests and donations of private individuals	2,368 97
From all other sources	.....
Total	$15,875 50

Expenditures.

Butchers' meat	$1,699 26
Butter and eggs	905 62
Flour, bread and meal	534 97
Milk	106 12
Tea and coffee	243 85
Potatoes and other vegetables	525 99
Groceries and provisions not enumerated	1,507 68
Surgical instruments	673 80
Drugs and medicines	514 58
Medical and surgical appliances	322 85
Beer, wine and spirits	131 59
Bedding, napery and general house furnishings	1,283 59
Brooms, brushes, mops, soap and cleaning appliances	187 76
Fuel	1,477 04
Electric light, gas, oil and candles	246 35
Water	100 00

GENERAL HOSPITAL, PEMBROKE.—*Continued.*

Hay and straw	227 62
Clothing for patients, including boots and shoes	229 83
Ice	125 85
Salaries and wages	2,973 78
Contingencies	78 66
Repairs, ordinary	2,971 48
Taxes and insurance	264 32
Printing, stationery, etc.	151 11
Total	$17,483 71
Government grant for 1916	$2,632 34

COTTAGE HOSPITAL, PEMBROKE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	18
Admitted	284
Births in Hospital	30
Total number under treatment	332
Discharged	297
Died	21
Under treatment, 30th September, 1916	14
	332

Sex.

Male	167
Female	165
	332

Revenue.

From the Province of Ontario	$508 39
From the County of Renfrew.	435 19
From Town of Pembroke	500 00
From patients themselves for maintenance and treatment	4,786 97
From endowments, investments, etc.	.....
From subscriptions, donations and bequests from private individuals	1,814 04
From other sources	20 19
Total	$8,064 78

Expenditures.

Butchers' meat	$526 68
Butter and eggs	474 61
Flour, bread and meal	150 87
Milk	355 60
Tea and coffee	75 99
Potatoes and other vegetables	138 22
Groceries and provisions not enumerated	1,006 84
Drugs and medicines	669 24
Medical and surgical appliances	25 00
Surgical instruments	.....
Beer, wine and spirits	15 90
Bedding, napery and general house furnishings	222 01
Brooms, brushes, mops, soap and cleaning appliances	46 41
Fuel	301 98
Electric light, gas, oil and candles	261 57
Water supply	60 40
Salaries and wages	2,777 31
Taxes and insurance	.....
Hay and straw	.....
Contingencies	128 05
Repairs, ordinary	314 14
Ice supply	55 87
Printing, postage, etc.	83 30
Total	$7,689 98
Government grant for 1916	$616 23

GENERAL HOSPITAL, MATTAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	24
Admitted	307
Total number under treatment	331
Discharged	298
Died	9
Under treatment, 30th September, 1916	24
	331

Sex.

Male	200
Female	131
	331

Revenue.

From the Province of Ontario	$2,295 32
From Town of Mattawa	135 00
From patients for maintenance and treatment	2,797 00
From subscriptions, bequests and donations of private individuals	90 00
From other sources	1,840 75
Total	$7,158 07

Expenditures.

Butchers' meat	$595 64
Butter and eggs	305 96
Flour, bread and meal	399 29
Milk	240 15
Tea and coffee	275 00
Potatoes and other vegetables	230 00
Groceries and provisions not enumerated	260 00
Drugs and medicines	290 00
Medical and surgical appliances	186 25
Beer, wine and spirits	67 80
Surgical instruments	230 00
Bedding, napery and general house furnishings	436 25
Brooms, brushes, etc.	157 40
Fuel	557 78
Electric light, gas, oil, candles	195 70
Water supply	98 35
Printing, stationery, etc.	69 75
Hay and straw	95 50
Ice	37 50
Salaries and wages	1,517 00
Taxes and insurance	159 30
Repairs, ordinary	108 12
Contingencies	125 32
Clothing for patients	220 00
Coffins and funerals	25 00
Total	$7,247 06
Government grant for 1916	$1,524 89

GENERAL HOSPITAL, BRANTFORD.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	58
Admitted	1,596
Births in the Hospital	73
Total number under treatment	1,727
Discharged	1,553
Died	85
Under treatment, 30th September, 1916	89
	1,727

Sex.

Male	903
Female	824
	1,727

Revenue.

From the Province of Ontario	$2,902 46
From the City of Brantford	16,500 00
From the County of Brant	500 00
From other municipalities	175 00
From patients for maintenance and treatment	23,619 68
Income from endowments, investments, etc.	107 11
From subscriptions, donations and bequests from private individuals	1,189 80
From all other sources	210 36
Total	$45,204 41

Expenditures.

Butchers' meat	$3,391 12
Butter and eggs	2,503 55
Flour, bread and meal	1,067 99

GENERAL HOSPITAL, BRANTFORD.—*Continued.*

Milk	1,607 44	Fuel	4,923 86
Tea and coffee	401 44	Electric light, gas, oil, candles	1,136 80
Potatoes and other vegetables	1,507 69	Ice	285 00
Groceries and provisions not enumerated	3,204 21	Salaries and wages	14,218 82
Drugs and medicines	2,641 96	Taxes and insurance	71 16
Medical and surgical appliances and surgical instruments	3,085 27	Printing, stationery, etc.	358 17
Beer, wine and spirits	262 28	Contingencies	3,115 37
Bedding, napery and general house furnishings	1,809 44	Repairs, ordinary	1,148 75
Brooms, brushes, mops, soap and cleaning appliances	450 52	Hay and straw	214 24
		Horse, wagon and harness	33 15
		Total	$47,438 23
		Government grant for 1916	$3,534 38

ST. JOSEPH'S HOSPITAL, PORT ARTHUR.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	42
Admitted	1,027
Births in Hospital	74
Total number under treatment	1,143
Discharged	1,064
Died	46
Under treatment, 30th September, 1916	33
	1,143

Sex.

Male	698
Female	445
	1,143

Revenue.

From the Province of Ontario	$1,854 21
From the City of Port Arthur	5,890 00
From patients themselves for maintenance and treatment	15,111 61
From subscriptions, donations and bequests from private individuals	3,548 00
From other sources	1,544 00
Total	$27,947 82

Expenditures.

Butchers' meat and fish	$1,794 19
Butter and eggs	1,134 86
Flour, bread and meal	902 66
Milk	507 55
Tea and coffee	331 88
Potatoes and other vegetables	220 01
Groceries and provisions not enumerated	2,209 13
Drugs and medicines	938 42
Surgical and medical appliances	1,405 34
Beer, wine and spirits	191 00
Bedding, napery and general house furnishings	3,188 14
Fuel	5,250 74
Brooms, brushes, mops, soap and cleaning appliances	384 45
Electric light, gas, oil and power	204 50
Water supply	210 85
Ice	113 95
Salaries and wages	5,323 67
Taxes and insurance, telephone and power	538 03
Stationery, printing, etc.	82 60
Contingencies	896 82
Repairs, ordinary	1,554 64
Hay and straw	191 80
Clothing for patients	.....
Surgical instruments	190 92
Telephone and power	.....
Interest	350 00
Total	$28,116 15
Government grant for 1916	$2,014 23

GENERAL HOSPITAL, BELLEVILLE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	42
Admitted	927
Births in Hospital	70
Total number under treatment	1,039
Discharged	970
Died	44
Under treatment, 30th September, 1916	25
	1,039

Sex.

Male	572
Female	467
	1,039

Revenue.

From the Province of Ontario	$1,333 10
From the City of Belleville	1,000 00
From County of Hastings	400 00
From patients for maintenance and treatment	17,729 50
Income from endowments, investments, etc.	188 50
From subscriptions, donations and bequests from private individuals	768 85
From other sources	4,019 99
Total	$25,439 94

Expenditures.

Butchers' meat	$1,613 21
Butter and eggs	930 63
Flour, bread and meal	505 16
Milk	713 75
Tea and coffee	218 21
Potatoes and other vegetables	486 14
Groceries and provisions not enumerated	1,215 41
Drugs and medicines	1,288 39
Medical and surgical appliances	558 32
Beer, wine and spirits	85 52
Bedding, napery and general house furnishings	1,151 80
Brooms, brushes, mops, soap and cleaning appliances	346 03
Fuel	1,309 14
Electric light, gas, oil and candles	848 04
Clothing for patients	102 28
Ice supply	69 00
Salaries and wages	5,455 15
Contingencies	184 62
Repairs, ordinary	474 82
Stationery and printing	288 91
Taxes, insurance and interest	56 78
Total	$17,901 31
Government grant for 1916	$1,385 16

ST. VINCENT DE PAUL HOSPITAL, BROCKVILLE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	48
Admitted	1,146
Births in Hospital	56
Total number under treatment	1,250
Discharged	1,153
Died	49
Under treatment, 30th September, 1916	48
	1,250

Sex.

Male	590
Female	660
	1,250

Revenue.

From the Province of Ontario	$2,789 98
From the Town of Brockville	2,000 00
From other municipalities	848 00
From paying patients	17,987 00
From subscriptions, bequests and donations from private individuals	802 00

ST. VINCENT DE PAUL HOSPITAL, BROCKVILLE.—*Continued.*

From other sources, not enumerated	4,239 65
Total	$28,666 63

Expenditures.

Butchers' meat and fish	$4,255 65
Butter and eggs	2,236 68
Flour, bread and meal	891 70
Milk	1,588 21
Tea and coffee	602 75
Potatoes and other vegetables	638 99
Groceries and provisions not enumerated	2,130 81
Drugs and medicines	470 57
Medical and surgical appliances	603 84
Bedding, napery and general house furnishings	1,890 78
Brooms, brushes, mops, soap and cleaning appliances	766 35
Fuel	3,575 16
Electric light, gas, oil, candles	780 78
Water supply	26 40
Clothing for sisters, including boots and shoes	.....
Ice supply	305 79
Salaries and wages	3,415 75
Taxes, insurance and interest	342 01
Contingencies	797 37
Repairs, ordinary	2,972 28
Printing, stationery, etc.	234 71
Surgical instruments	.....
Beer, wine and spirits	79 67
Total	$28,606 25
Government grant for 1916	$2,488 57

THE BROCKVILLE GENERAL HOSPITAL.

The following summaries show the operations of the Hospital during the official year:

Movemcnts of Patients.

Number under treatment, 1st October, 1915	37
Number admitted	915
Births in Hospital	60
Total number under treatment	1,012
Discharged	930
Died	40
Under treatment, 30th September, 1916	42
	1,012

Sex.

Male	591
Female	421
	1,012

Revenue.

From the Province of Ontario	$1,269 26
From the Town of Brockville	2,000 00
From the Counties of Leeds and Grenville	.....
From other municipalities of the Province	.....
From paying patients	19,573 90
From property belonging to the Hospital	1,280 32
From subscriptions, bequests and donations from private individuals	9,245 85
From other sources not enumerated	300 00
Total	$33,669 33

Expenditures.

Butchers' meat	$2,673 64
Butter and eggs	2,064 61
Flour, bread and meal	533 78
Milk	1,224 91
Tea and coffee	177 97
Potatoes and other vegetables	622 54
Groceries and provisions not enumerated	2,511 00
Drugs and medicines	1,032 26
Medical and surgical appliances	766 78
Bedding, napery and general house furnishings	646 76
Brooms, brushes mops, soap and cleaning appliances	141 95
Fuel	1,899 20
Electric light, gas, oil, candles	1,047 29
Water supply	26 40
Ice supply	159 58
Salaries and wages	6,105 45
Taxes and insurance	156 28
Contingencies	497 54
Repairs, ordinary	679 45
Ambulance	106 50
Printing, stationery, etc.	157 68
Laundry expenses	1,549 96
Bank overdraft	7,666 46
Total	$32,447 99
Government grant for 1916	$721 52

GENERAL AND MARINE HOSPITAL, COLLINGWOOD.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	28
Admitted	429
Number of births in the Institution during the year	19
Total number under treatment	476
Discharged	417
Died	23
Under treatment, 30th September, 1916	36
	476

Sex.

Male	270
Female	206
	476

Revenue.

Received from the Province of Ontario	$846 34
From the Town of Collingwood	1,500 00
From the County of Simcoe.	500 00
From paying patients	9,018 05
Subscriptions, donations, etc..	68 71
From sources not enumerated	35 00
Total	$11,968 10

Expenditures.

Butchers' meat	$1,111 12
Butter and eggs	745 02
Flour, bread and meal	425 34
Milk	467 00
Tea and coffee	159 46
Potatoes and other vegetables	243 33
Groceries and provisions not enumerated	1,022 41
Drugs and medicines	636 21
Medical and surgical appliances	230 10
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	685 66
Brooms, brushes, mops, etc..	91 48
Fuel	1,547 54
Electric light, gas, oil, candles	156 69
Water supply	89 21
Ice	149 00
Salaries and wages	3,106 25
Contingencies	306 72
Repairs, ordinary	836 35
Taxes and insurance	.....
Total	$12,008 89
Government grant for 1916 ..	$902 02

THE NICHOLLS' HOSPITAL, PETERBOROUGH.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	36
Admitted	1,097
Births in Hospital	87
Total number under treatment	1,220
Discharged	1,125
Died	57
Under treatment, 30th September, 1916	38
	1,220

Sex.

Male	621
Female	599
	1,220

Revenue.

From the Province of Ontario	$1,592 40
From the City of Peterborough	1,272 00
From patients themselves for maintenance and treatment.	19,324 83
From property belonging to Hospital, endowments, etc. .	10,059 99
From subscriptions, donations, and bequests from private individuals	95 10
Total	$32,344 32

Expenditures.

Butchers' meat	$2,236 79
Butter and eggs	1,617 75
Flour, bread and meal	604 15
Milk	676 40
Tea and coffee	51 80
Potatoes and other vegetables	586 68

THE NICHOLLS' HOSPITAL, PETERBOROUGH.—*Continued.*

Groceries and provisions not enumerated	1,919 72
Drugs and medicines	1,647 14
Surgical instruments and appliances	1,524 63
Beer, wine and spirits	32 15
Bedding, napery and general house furnishings	1,167 43
Brooms, brushes, mops, soap and cleaning appliances	188 48
Fuel	3,188 98
Electric light, gas, oil, candles	610 01
Water supply	150 00
Clothing for patients	.....
Ice	68 09
Salaries and wages	8,617 10
Taxes and Insurance	224 75
Hay and straw	.....
Contingencies	491 41
Printing, stationery, etc.	155 60
Repairs, ordinary	854 80
Total	$26,613 77
Government grant for 1916	$1,691 92

ST. JOSEPH'S HOSPITAL, PETERBOROUGH.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	23
Admitted	704
Births in Hospital	43
Total number under treatment	770
Discharged	709
Died	24
Under treatment, 30th September, 1916	37
	770

Sex.

Male	352
Female	418
	770

Revenue.

From the Province of Ontario	$1,082 50
From the City of Peterborough	1,085 00
From patients themselves for maintenance and treatment	9,025 94
From subscriptions, donations and bequests from private individuals	.....
From all other sources	612 87
Total	$11,806 31

Expenditures.

Butchers' meat	$1,136 15
Butter and eggs	728 72
Flour, bread and meal	242 30
Milk	340 51
Tea and coffee	126 55
Potatoes and other vegetables	436 32
Groceries and provisions not enumerated	1,053 85
Drugs and medicines	495 80
Medical and surgical appliances	695 80
Beer, wine and spirits	50 12
Bedding, napery and general house furnishings	1,663 39
Brooms, brushes, mops soap and cleaning appliances	98 68
Fuel	1,739 96
Electric light, gas, oil, and power	434 08
Water supply	145 54
Hay and straw	199 72
Clothing for sisters	.....
Salaries and wages	1,766 40
Printing, stationery, etc.	86 15
Contingencies	93 69
Taxes and insurance	.....
Repairs, ordinary	580 32
Ice supply	42 00
Total	$12,155 15
Government grant for 1916	$1,442 60

HOTEL DIEU HOSPITAL, WINDSOR.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	47
Admitted	1,262
Births in Hospital	119
Total number under treatment	1,428
Discharged	1,284
Died	87
Under treatment, 30th September, 1916	57
	1,428

Sex.

Male	670
Female	758
	1,428

Revenue.

From the Province of Ontario	$1,906 76
From the Town of Windsor	979 20
From the County of Essex	36 00
From patients themselves for maintenance and treatment.	19,064 69
Subscriptions, donations and bequests	391 76
From other sources not enumerated	3,832 53
Total	$26,210 94

Expenditures.

Butchers' meat	$2,984 43
Butter and eggs	1,376 13
Flour, bread and meal	622 32
Milk	1,382 18
Tea and coffee	415 69
Potatoes and other vegetables	1,480 35
Groceries and provisions not enumerated	4,070 56
Drugs and medicines	968 24
Medical and surgical appliances	1,221 26
Surgical instruments	91 42
Beer, wine and spirits	187 93
Bedding, napery and general house furnishings	1,207 40
Brooms, brushes, mops, soap and cleaning appliances	514 82
Fuel	949 60
Light: gas, oil and candles	582 89
Water supply	607 46
Hay and straw	41 36
Clothing for patients, including boots and shoes	84 40
Ice	388 89
Salaries and wages	4,524 27
Taxes and insurance	257 23
Contingencies	244 95
Repairs, ordinary	748 92
Printing, stationery, etc.	1,391 17
Total	$26,343 87
Government grant for 1916	$2,562 84

ST. JOSEPH'S HOSPITAL, CHATHAM.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	37
Admitted	676
Births in Hospital	90
Total under treatment	803
Discharged	719
Died	42
Under treatment, 30th September, 1916	42
	803

Sex.

Male	355
Female	448
	803

Revenue.

From the Province of Ontario	$753 55
From the Town of Chatham	1,314 00
From the County of Kent	220 00
From patients for maintenance and treatment	13,343 34
From subscriptions, donations and bequests from private individuals	500 00
From other sources	316 77
Total	$16,447 66

Expenditure.

Butchers' meat	1,473 61
Butter and eggs	1,253 46
Flour, bread and meal	821 17
Milk	746 07
Tea and coffee	262 27

ST. JOSEPH'S HOSPITAL, CHATHAM.—*Continued.*

Potatoes and other vegetables	431 74
Groceries and provisions not enumerated	1,944 98
Drugs and medicines	172 84
Medical and surgical appliances	609 33
Beer, wine and spirits	52 40
Bedding, napery and general house furnishings	1,197 81
Brooms, brushes, mops, soap and cleaning appliances	184 75
Fuel	964 35
Light: electric, gas, oil, candles	256 78
Ice supply	37 37
Salaries and wages	2,207 79
Taxes, insurance and interest	2,004 25
Contingencies	160 39
Repairs, ordinary	1,674 28
Advertising, printing and postage	86 69
Total	$16,542 33
Government grant for 1916	$643 06

GENERAL HOSPITAL, CHATHAM.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	34
Admitted	745
Births in Hospital	94
Total number under treatment	873
Discharged	790
Died	41
Under treatment, 30th September, 1916	42
	873

Sex.

Male	415
Female	458
	873

Revenue.

From the Province of Ontario	$1,013 85
From the City of Chatham	703 00
From the County of Kent	.....
From other municipalities of the Province	1,117 75
From patients themselves for maintenance and treatment	17,637 46
From subscriptions, donations and bequests from private individuals	.....
From all other sources	.....
Total	$20,472 06

Expenditures.

Butchers' meat	$1,194 23
Butter and eggs	566 17
Flour, bread and meal	477 79
Milk	772 48
Tea and coffee	355 46
Potatoes and other vegetables	280 17
Groceries and provisions not enumerated	3,288 89
Drugs and medicines	407 74
Surgical instruments	394 34
Beer, wine and spirits	10 50
Bedding, napery and general house furnishings	877 72
Brooms, brushes, mops, soap and cleaning appliances	.....
Fuel	1,046 70
Electric light, gas, oil, candles	281 79
Ice	90 00
Salaries and wages	5,668 10
Insurance and interest	148 00
Contingencies	2,343 62
Repairs, ordinary	1,575 15
Laundry	739 75
Total	$21,018 51
Government grant for 1916	$978 04

GENERAL HOSPITAL, STRATFORD.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	35
Admitted	638
Number of births during the year	60
Total number under treatment	733
Discharged	653
Died	59
Under treatment, 30th September, 1916	21
	733

Sex.

Male	389
Female	344
	733

Revenue.

Received from the Province of Ontario	$1,117 18
From the City of Stratford	3,000 00
From the County of Perth	1,000 00
From other municipalities of the Province	185 00
From paying patients	16,315 05
Income from endowments, investments, etc.	.....
Subscriptions, donations, etc.	2,742 75
From other sources	105 00
Total	$24,464 98

Expenditures.

Butchers' meat	$1,731 00
Butter and eggs	1,562 02
Flour, bread and meal	595 65
Milk	778 99
Tea and coffee	199 92
Potatoes and other vegetables	566 44
Groceries and provisions not enumerated	1,207 98
Drugs and medicines	586 32
Medical and surgical appliances	1,775 59
Surgical instruments	31 55
Beer, wine and spirits	57 10
Bedding, napery and general house furnishings	438 65
Brooms, brushes, mops, etc.	430 82
Fuel	1,693 42
Electric light, gas, oil, candles	791 48
Water supply	73 26
Ice	127 26
Salaries and wages	5,331 36
Taxes and insurance	61 57
Contingencies	712 35
Repairs, ordinary	2,192 89
Postage, etc.	35 69
Total	$20,981 31
Government grant for 1916	$1,528 51

AMASA WOOD HOSPITAL, ST. THOMAS.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	30
Admitted	776
Births in the hospital	119
Total number under treatment	925
Discharged	837
Died	55
Under treatment, 30th September, 1916	33
	925

Sex.

Male	490
Female	435
	925

Revenue.

From the Province of Ontario	$1,335 70
From the City of St. Thomas	8,000 00
From paying patients themselves	11,934 07
Other sources	1,417 42
Total	$22,687 19

Expenditures.

Butchers' meat	$922 02
Butter and eggs	721 74
Flour, bread and meal	419 15
Milk	792 35
Tea and coffee	208 45
Potatoes and other vegetables	320 28
Groceries and other provisions not enumerated	3,049 51
Drugs and medicines	1,300 38

AMASA WOOD HOSPITAL—*Continued.*

Medical and surgical appliances	81 95
Surgical instruments	69 90
Beer, wine and spirits	18 20
Bedding, etc.	1,171 93
Brooms, brushes, mops, soap and cleaning appliances	1,494 86
Fuel	1,408 83
Electric light, gas, oil, candles	561 91
Water supply	112 15
Ice	95 87
Ambulance expenses	115 00

Salaries and wages	4,556 10
Taxes and insurance	111 90
Contingencies	670 68
Repairs, ordinary	144 84
Printing, stationery, etc.	170 54
Coffins and funerals	.....
Bank overdraft	1,175 28
Total	$19,633 77
Government grant for 1916	$1,638 73

GENERAL AND MARINE HOSPITAL, OWEN SOUND.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	32
Admitted	545
Births in hospital	68
Total number under treatment	645
Discharged	567
Died	55
Under treatment, 30th September, 1916	23
	645

Sex.

Male	302
Female	343
	645

Revenue.

From the Province of Ontario	$652 60
From the Town of Owen Sound	1,778 00
From the County of Grey	1,000 00
From other municipalities	50 00
From patients themselves for maintenance and treatment.	13,600 73
From subscriptions, bequests and donations of private persons	265 00
From all other sources not enumerated	343 00
Total	$17,685 33

Expenditures.

Butchers' meat and fish	$1,378 34
Butter and eggs	792 38
Flour, bread and meal	417 20
Milk	702 79
Tea and coffee	240 60
Potatoes and other vegetables	437 79
Groceries and provisions not enumerated	2,694 84
Drugs and medicines	839 82
Medical and surgical appliances	494 56
Beer, wine and spirits	70 00
Bedding, napery and general house furnishings	2 88
Brooms, brushes, mops, soap and cleaning appliances	166 36
Fuel	2,606 66
Electric light, gas, oil	617 10
Ice	40 00
Salaries and wages	4,171 06
Insurance and interest	116 66
Contingencies	39 49
Repairs, ordinary	512 01
Printing, stationery, etc.	369 04
Total	$16,709 58
Government grant for 1916	$880 92

ST. JOSEPH'S HOSPITAL, SUDBURY.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	69
Number admitted	1,437
Births in hospital	55
Total number under treatment	1,561

ST. JOSEPH'S HOSPITAL—*Continued.*

Discharged	1,411
Died	71
Remaining under treatment on the 30th September, 1916	79
	1,561

Sex.

Male	992
Female	569
	1,561

Revenue.

From the Province of Ontario	$3,565 75
From paying patients themselves	25,489 20
Subscriptions, donations and bequests	798 48
Town of Sudbury	720 50
From all other sources not above enumerated	1,686 50
Total	$32,260 43

Expenditures.

Butchers' meat	$3,708 16
Butter and eggs	2,037 59
Flour, bread and meal	907 88
Milk	1,999 51
Tea and coffee	385 38
Potatoes and other vegetables	757 08
Groceries and provisions not enumerated	2,101 31
Drugs and medicines	655 15
Medical and surgical appliances	1,073 27
Beer, wine and spirits	101 10
Bedding, napery and general house furnishings	582 87
Brooms, brushes, mops, soap and cleaning appliances	1,120 38
Fuel	2,548 23
Electric light, gas and oil	615 18
Hay and straw	105 72
Clothing for patients	1,276 09
Ice	200 00
Salaries and wages	4,366 36
Contingencies	1,117 80
Repairs, ordinary	3,491 83
Taxes and insurance	780 25
Printing and stationery	243 70
Surgical instruments	141 62
Total	$30,316 46
Government grant for 1916	$4,224 49

THE WOODSTOCK HOSPITAL.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	21
Admitted	564
Births	43
Total number under treatment	628
Discharged	567
Died	36
Under treatment, 30th September, 1916	25
	628

Sex.

Male	310
Female	318
	628

Revenue.

From the Province of Ontario	$892 37
From the Town of Woodstock	1,200 00
From the County of Oxford	1,200 00
Income from endowments and investments	1,226 69
From paying patients themselves	11,746 51
Subscriptions, donations and bequests	177 00
Received from other sources	.....
Total	$16,442 57

Expenditures.

Butchers' meat	$1,650 57
Butter and eggs	1,346 83
Flour, bread and meal	221 37
Milk	471 83
Tea and coffee	255 25
Potatoes and other vegetables	82 25
Groceries and other provisions not enumerated	1,683 87
Drugs and medicines	356 82
Medical and surgical appliances	692 46
Beer, wine and spirits	22 60
Bedding, etc.	442 80
Brooms, brushes, mops, soap and cleaning appliances	178 48
Fuel	718 77

THE WOODSTOCK HOSPITAL.—*Continued.*

Electric light, gas, oil and candles	619 29
Ice	153 02
Salaries and wages	4,311 25
Insurance and taxes	85 19
Contingencies	488 14
Repairs, ordinary	367 99
Printing, stationery, etc.	78 47
Water supply	72 17
Total	$14,299 42
Government grant for 1916	$988 46

KITCHENER AND WATERLOO HOSPITAL, KITCHENER.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	29
Admitted	935
Births in Hospital	71
Total number under treatment	1,035
Discharged	940
Died	60
Under treatment, 30th September, 1916	35
	1,035

Sex.

Male	474
Female	561
	1,035

Revenue.

From the Province of Ontario	$967 30
From the Town of Kitchener.	3,750 00
From the County of Waterloo	2,000 00
From the town Waterloo	800 00
From patients for maintenance and treatment	13,674 40
From subscriptions, donations and bequests from private individuals	40 00
From other sources	248 60
Total	$21,480 30

Expenditure.

Butchers' meat	$1,449 27
Butter and eggs	699 05
Flour, bread and meal	483 82
Milk	1,058 68
Tea and coffee	.....
Potatoes and other vegetables	195 33
Groceries and provisions not enumerated	2,147 51
Drugs and medicines	1,669 75
Medical and surgical appliances	1036 16
Beer, wine and spirits	69 67
Bedding, napery and general house furnishings	.....
Brooms, brushes, mops, soap and cleaning appliances	401 10
Fuel	2,278 00
Electric light, gas, oil and candles	603 57
Ice supply	108 00
Salaries and wages	6,356 74
Insurance and taxes	604 28
Contingencies	1,475 32
Repairs, ordinary	315 66
Grounds	34 60
Repaid loan to bank	680 00
Total	$21,666 51
Government grant for 1916	$964 44

GENERAL HOSPITAL, SARNIA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	37
Admitted	593
Births in Hospital	85
Total number under treatment	715
Discharged	630
Died	58
Under treatment, 30th September, 1916	27
	715

GENERAL HOSPITAL, SARNIA.—*Continued.*

Sex.

Male	302
Female	413
	715

Revenue.

From the Province of Ontario	$1,150 66
From the Town of Sarnia	1,000 00
From the County of Lambton	600 00
From patients themselves for maintenance and treatment.	14,308 87
From property belonging to the Hospital	1,130 00
From subscriptions, donations, and bequests from private individuals	67 00
From all other sources	561 48
Total	$18,818 01

Expenditures.

Butchers' meat	1,911 20
Butter and eggs	1,141 79
Flour, bread and meal	338 03
Milk	694 71
Tea and coffee	.....
Potatoes and other vegetables	548 19
Groceries and provisions not enumerated	1,390 81
Drugs and medicines	352 71
Surgical instruments and appliances	1,036 31
Beer, wine and spirits	49 50
Bedding, napery and general house furnishings	1,584 42
Fuel	933 26
Electric light, gas, oil and candles	288 99
Laundry, etc.	1,485 43
Ice	110 28
Salaries and wages	3,868 44
Insurance	54 29
Contingencies	331 22
Repairs, ordinary	1,645 82
Stationery and printing	152 99
Clothing for nurses	164 90
Nurses' home	568 10
Total	$18,651 39
Government grant for 1916	$1,172 57

ROYAL VICTORIA HOSPITAL, BARRIE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	43
Admitted	875
Births in Hospital	78
Total number under treatment	996
Discharged	938
Died	19
Under treatment, 30th September, 1916	39
	996

Sex.

Male	626
Female	370
	996

Revenue.

From the Province of Ontario	$1,431 95
From the Town of Barrie	350 00
From the County of Simcoe	500 00
From other municipalities	.....
From patients for maintenance	12,247 04
From endowments, investments, etc.	462 00
From subscriptions, donations and bequests from private individauls	91 60
From other sources	240 68
Total	$15,323 27

Expenditures.

Butchers' meat	$1,101 03
Butter and eggs	1,380 84
Flour, bread and meal	644 50
Milk	697 17
Tea and coffee	.....
Potatoes and other vegetables	887 86
Groceries and provisions not enumerated	1,346 41
Drugs and medicines	396 29
Medical and surgical appliances	592 49
Beer, wine and spirits	4 00
Bedding, napery and general house furnishings	658 12
Brooms, brushes, mops, soap and cleaning appliances	244 63
Fuel	1,566 40
Electric light, gas, oil and candles	259 62
Water	170 74
Ice supply	40 00

ROYAL VICTORIA HOSPITAL, BARRIE.—*Continued.*

Salaries and wages	3,990 40
Interest	60 00
Contingencies	719 99
Repairs, ordinary	210 25
Taxes and insurance	88 50
Bank overdraft	128 93
Extra repairs	135 10
Total	$15,323 27
Government grant for 1916	$3,741 06

HOTEL DIEU HOSPITAL, CORNWALL.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	37
Admitted	1,072
Births in Hospital	45
Total number under treatment	1,154
Discharged	1,078
Died	35
Under treatment, 30th September, 1916	41
	1,154

Sex.

Male	644
Female	510
	1,154

Revenue.

From the Province of Ontario	$2,401 38
From the Town of Cornwall	600 00
From the Counties of Stormont, Dundas and Glengarry	1,000 00
From other municipalities in the Province	560 00
From paying patients themselves	10,912 43
From subscriptions, donations, etc.	1,800 00
From other sources	894 77
Total	$18,168 58

Expenditures.

Butchers' meat and fish	$2,335 61
Butter and eggs	1,200 35
Flour, bread and meal	495 00
Milk	500 75
Tea and coffee	587 25
Potatoes and other vegetables	591 18
Groceries and provisions not enumerated	1,795 86
Drugs and medicines	540 25
Medical and surgical appliances	999 74
Surgical instruments	115 85
Beer, wine and spirits	58 75
Bedding, napery and general house furnishings	1,755 63
Brooms, brushes, mops, soap and cleaning appliances	476 18
Fuel	1,802 25
Electric light, gas, oil and candles	480 98
Ice	220 00
Salaries and wages	1,250 65
Taxes and insurance	313 78
Contingencies	1,850 19
Repairs, ordinary	986 22
Clothing for patients	.....
Hay and straw	189 95
Total	$18 546 42
Government grant for 1916	$2,246 51

GENERAL HOSPITAL, CORNWALL.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Total under treatment, 1st October, 1915	32
Admitted	770
Births in Hospital	35
Total number under treatment	837
Discharged	771
Died	23
Under treatment, 30th September, 1916	43
	837

GENERAL HOSPITAL, CORNWALL.—*Continued.*

Sex.

Male	518
Female	319
	837

Revenue.

From the Province of Ontario	$1,384 21
From the Town of Cornwall	600 00
From the Counties of Stormont, Dundas and Glengarry	1,000 00
From other municipalities in the Province	300 00
From paying patients themselves	12,969 70
From subscriptions, donations, etc.	3,153 17
From other sources	676 55
Total	$20,083 63

Expenditures.

Butchers' meat and fish	$1,000 56
Butter and eggs	1,027 59
Flour, bread and meal	364 66
Milk	556 85
Tea and coffee	152 94
Potatoes and other vegetables	212 94
Groceries and provisions not enumerated	1,197 23
Drugs and medicines	571 04
Medical and surgical appliances	1,123 68
Surgical instruments	6 70
Beer, wine and spirits	16 11
Bedding, napery and general house furnishings	395 13
Brooms, brushes, mops, soap and cleaning appliances	180 57
Fuel	1,525 55
Electric light, gas, oil, candles	584 38
Salaries and wages	3,851 40
Laundry	849 62
Contingencies	46 48
Repairs, ordinary	1,224 94
Printing, stationery, postage, telephone, etc.	356 57
Ice	40 00
Insurance and interest	67 50
Hay and straw	.....
Clothing for patients	.....
Total	$15,352 44
Government grant for 1916	$999 97

NATIONAL SANATORIUM FOR CONSUMPTIVES, GRAVENHURST.

(Muskoka Cottages.)

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	33
Admitted	123
Total number under treatment	156
Discharged	103
Died	5
Under treatment, 30th September, 1916	48
	156

Sex.

Male	92
Female	64
	156

Revenue.

From the Province of Ontario	.....
From paying patients themselves	$39,546 01
From subscriptions, bequests and donations of private indiviuals	2,809 29
From other sources	1,770 84
Total	$44,126 14

Expenditures.

Butchers' meat	$12,730 12
Butter and eggs	4,989 79
Flour, bread and meal	1,645 93
Milk	3,180 35
Tea and coffee	563 25
Potatoes and other vegetables	2,185 05
Groceries and provisions not enumerated	4,541 46
Drugs and medicines	1,217 20
Medical and surgical appliances	130 88
Bedding, napery and general house furnishings	4,730 61
Brooms, brushes, mops, soap and cleaning appliances and laundry	948 90
Fuel	7,403 57
Electric light, oil and candles	950 07
Maintenance of plant	8,950 67

NATIONAL SANATORIUM FOR CONSUMPTIVES, GRAVENHURST.—*Continued.*

Telephone	226 04
Ice	89 20
Salaries and wages	12,404 86
Freight and livery	188 57
Advertising, printing, postage, etc.	1,636 97
Contingencies	55 29
Repairs, ordinary	2,126 47
Insurance premiums	520 62
Bank interest and exchange	151 40
Travelling expenses	512 48
Improving grounds	305 71
Laundry	1,926 33
H. O. expense	542 04
X-Ray and medical staff supplies	36 00
General expenses	162 40
Hay and straw	1,059 53
Total	$76,111 76
Less refund, Muskoka Free Hospital patients	30,672 01
	$45,439 75

MUSKOKA FREE HOSPITAL FOR CONSUMPTIVES.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	224
Admitted	453
Number of births	.....
Total number under treatment	677
Discharged	398
Died	39
Under treatment 30th September, 1916	240
	677

Sex.

Male	438
Female	239
	677

Revenue.

From the Province of Ontario	$31,467 85
From the City of Toronto, in payment of patients' maintenance	51,504 39
From other municipalities	9,666 89
From endowments, investments, etc.	6,331 84
From paying patients themselves	7,370 00
Subscriptions, donations and bequests of private individuals	23,677 33
From all other sources not above enumerated	1,978 02
Total	$131,996 32

Expenditures.

Butchers' meat	$18,648 83
Butter and eggs	8,276 60
Flour, bread and meal	2,800 49
Milk	5,868 49
Tea and coffee	1,060 70
Potatoes and other vegetables	3,305 04
Groceries and provisions not enumerated	7,918 24
Drugs and medicines	2,648 96
Medical and surgical appliances, dispensary	.....
Bedding, napery and general house furnishings	5,946 07
Brooms, brushes, mops, soap and cleansing appliances	1,049 04
Fuel	6,262 29
Maintenance of plant	11,108 84
Improving grounds	978 07
Travelling expenses	525 65
Electric light, gas, oil and candles	940 08
Ice supply	151 54
Salaries and wages	29,872 47
Insurance and taxes	585 99
Laundry	3,690 56
Contingencies	605 99
Repairs, ordinary	3,296 96
Interest and bank collection	343 90
Postage and advertising	1,073 26
Freight and livery	97 21
Surgical instruments	1,241 01
X-Ray expenses	649 00
Head office expenses	3,601 00
Outdoor furnishings	139 55
Medical staff supplies	98 40
Maintenance of transferred patients	30,672 01
Telephones	254 34
General expenses	4,081 52
Transferred patients' keep	2,907 08
Total	$160,699 19
Government grant for 1916	$41,131 29

GENERAL HOSPITAL, KENORA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	7
Admitted	216
Number of births in Hospital	18
Total number under treatment	241
Discharged	215
Died	12
Under treatment 30th September, 1916	14
	241

Sex.

Male	147
Female	94
	241

Revenue.

From the Province of Ontario	$748 30
From the Town of Kenora	1,000 00
From other municipalities	500 00
From paying patients	3,301 55
Subscriptions, donations, etc.	119 00
Care of lumber and railway camp cases	.....
From other sources	476 03
Total	$6,144 88

Expenditures.

Potatoes and other vegetables	$499 33
Butchers' meat and fish / Butter and eggs	300 00
Bread	155 30
Milk	150 00
Groceries and provisions not enumerated, flour and meal	437 35
Drugs and medicines and surgical appliances	372 06
Surgical instruments	.....
Beer, wine and spirits	28 22
Bedding, napery and general house furnishings	135 20
Fuel	551 30
Electric light, gas, oil and candles and water	14 11
Ice	40 00
Salaries and wages	2,524 65
Contingencies	125 63
Repairs, ordinary	548 48
Insurance	121 70
Stationery, postage, etc.	39 90
Hay and straw	92 42
Clothing for patients	.....
Brooms, mops, etc.	47 50
Total	$6,183 15
Government aid for 1916	$290 50

ST. JOSEPH'S HOSPITAL, KENORA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treamtnent 1st October, 1915	14
Admitted	132
Births in Hospital	7
Total number under treatment	153
Discharged	128
Died	9
Under treatment 30th September, 1916	16
	153

Sex.

Male	83
Female	70
	153

Revenue.

From the Province of Ontario	$534 06
From the Town of Kenora	1,296 00
From Dominion Government	125 05
From patients themselves for maintenance and treatment	1,728 90
From subscriptions, donations and bequests of private individuals	1,272 15
From other sources	891 85
Total	$5,848 01

Expenditures.

Butchers' meat and fish	$397 05
Butter and eggs	290 90
Flour, bread and meal	185 25
Milk	240 90
Tea and coffee	79 80
Potatoes and other vegetables	152 40

ST. JOSEPH'S HOSPITAL, KENORA.—*Continued.*

Groceries and provisions not enumerated	316 80
Drugs and medicines	175 14
Surgical instruments	32 00
Medical and surgical appliances	81 55
Beer, wine and spirits and mineral water	17 25
Bedding, napery and general house furnishings	95 65
Brooms, brushes, mops, soap and cleaning appliances	144 50
Fuel	510 32
Electric light, gas, oil and candles	92 74
Clothing for patients	118 22
Ice	40 00
Salaries and wages	1,036 15
Insurance	125 85
Contingencies	128 20
Repairs, ordinary	1,014 20
Hay and straw	524 05
Printing, stationery, etc.	20 56
Coffins and funerals	.....
Total	$5,819 48
Government grant for 1916	$556 85

GENERAL HOSPITAL, SAULT STE. MARIE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	39
Admitted	727
Births in Hospital	38
Total number under treatment	804
Discharged	715
Died	50
Under treatment 30th September, 1916	39
	804

Sex.

Male	496
Female	308
	804

Revenue.

From the Province of Ontario	$1,913 40
From the City of Sault Ste. Marie	1,493 00
From other municipalities	.....
From patients themselves for maintenance and treatment	18,840 63
Subscriptions, donations and bequests of private individuals	807 47
From other sources not enumerated	800 00
Total	$23,854 50

Expenditures.

Butchers' meat	$2,689 17
Butter and eggs	1,550 17
Flour, bread and meal	756 00
Milk	1,240 00
Tea and coffee	592 76
Potatoes, vegetables and fruit	476 00
Groceries and provisions not enumerated	1,151 07
Drugs and medicines	833 00
Medical and surgical appliances	480 00
Beer, wine and spirits	280 00
Bedding, napery and general house furnishings	323 00
Brooms, brushes, mops, soap and cleaning appliances	280 00
Fuel	2,135 80
Electric light, gas, oil and candles	295 45
Water supply	153 54
Clothing for patients, including boots and shoes	825 60
Ice	286 80
Salaries and wages	3,658 40
Contingencies	680 70
Repairs, ordinary	763 00
Taxes and insurance	211 26
Printing, stationery, etc.	260 86
Hay and straw	436 06
Total	$20,358 64
Government grant for 1916	$2,551 27

VICTORIA GENERAL HOSPITAL, RENFREW.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	27
Admitted	450
Births in Hospital	24
Total number under treatment	501
Discharged	456
Died	23
Under treatment 30th September, 1916	22
	501

Sex.

Male	305
Female	196
	501

Revenue.

From the Province of Ontario	$674 95
From the Town of Renfrew	600 00
From the County of Renfrew	502 06
From other municipalities	20 00
From patients for maintenance and treatment	7,426 74
From subscriptions, donations and bequests from private individuals	69 00
Total	$9,292 75

Expenditures.

Butchers' meat	$997 68
Butter and eggs	492 01
Flour, bread and meal	308 65
Milk	554 47
Tea and coffee	64 20
Potatoes and other vegetables	139 92
Groceries and provisions not enumerated	1,021 07
Medical and surgical appliances	346 34
Surgical instruments	.....
Drugs and medicines	890 15
Bedding, napery and general house furnishings	333 78
Fuel	518 95
Electric light, gas, oil, candles	268 96
Water supply	30 61
Ice supply	74 74
Salaries and wages	3,061 82
Laundry	178 04
Contingencies	407 35
Repairs, ordinary	84 56
Brooms, brushes and cleaning	98 35
Beer, wine and spirits	13 70
Total	$9,884 85
Government grant for 1916	$736 16

THE ROSS MEMORIAL HOSPITAL, LINDSAY.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	22
Admitted	486
Births in Hospital	25
Total number under treatment	533
Discharged	490
Died	24
Under treatment 30th September, 1916	19
	533

Sex.

Male	309
Female	224
	533

Revenue.

From the Province of Ontario	$585 25
From the Town of Lindsay	600 00
From the County of Victoria	1,100 00
From other municipalities	.....
From patients themselves for maintenance and treatment	8,320 00
Income from endowments	2,200 88
Subscriptions, donations and bequests of private individuals	368 16
From other sources not enumerated	1,620 20
Total	$14,794 49

Expenditures.

Butchers' meat	$1,151 23
Butter and eggs	827 89
Flour, bread and meal	306 77

THE ROSS MEMORIAL HOSPITAL, LINDSAY.—*Continued.*

Milk	510 14
Tea and coffee	130 81
Potatoes and other vegetables	285 79
Groceries and provisions not enumerated	685 29
Drugs and medicines	798 36
Medical and surgical appliances	622 44
Surgical instruments	36 45
Beer, wine and spirits	8 25
Bedding, napery and general house furnishings	450 80
Brooms, brushes, mops, soap and cleaning appliances	165 24
Fuel	1,047 81
Electric light, gas, oil and candles	101 69
Water supply	85 00
Clothing for patients, including boots and shoes	16 10
Ice	110 00
Salaries and wages	3,769 83
Contingencies	568 50
Repairs, ordinary	507 64
Taxes and insurance	22 51
Stationery, postage, etc.	135 66
Annie Ross Nurses' Home	458 35
Total	$12,802 55
Government grant for 1916	$752 69

McKELLAR GENERAL HOSPITAL, FORT WILLIAM.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	53
Admitted	1,720
Number of births in Hospital	169
Total number under treatment	1,942
Discharged	1,774
Died	105
Under treatment 30th September, 1916	63
	1,942

Sex.

Male	1,095
Female	847
	1,942

Revenue.

From the Province of Ontario	$2,425 89
From the Town of Fort William	7,200 00
From other municipalities	.....
From paying patients	23,371 96
Subscriptions, donations, etc.	815 36
Other sources	4,682 36
Total	$38,495 57

Expenditures.

Butchers' meat	$2,218 84
Flour, bread and meal	2,266 45
Milk	951 90
Butter and eggs	1,599 70
Tea and coffee	410 70
Potatoes and other vegetables	503 15
Groceries and provisions not enumerated	2,504 35
Drugs and medicines	1,161 97
Medical and surgical appliances	2,299 19
Beer, wine and spirits	79 10
Bedding, napery and general house furnishings	.....
Brooms, brushes, mops, soap and cleaning appliances and laundry	1,431 71
Fuel	4,684 63
Taxes, insurance	41 50
Printing, stationery, etc.	452 03
Salaries and wages	12,333 46
Contingencies	733 03
Repairs, ordinary	1,573 83
Interest	50 92
Water supply	542 74
Fish	451 71
Electric light, gas, oil, etc.	349 80
Total	$36,640 71
Government grant for 1916	$2,667 46

GENERAL HOSPITAL, WALKERTON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	13
Number admitted	272
Number of births	11
	296
Discharged	269
Died	16
Under treatment 30th September, 1916	11
	296

Sex.

Male	191
Female	105
	296

Revenue.

From the Province of Ontario	$483 94
From the Town of Walkerton	100 00
From the County of Bruce	2,000 00
From other municipalities of the Province	45 25
From endowments, investments, etc.	.....
From paying patients	3,910 72
From subscriptions, bequests and donations of private individuals	757 26
From other sources not enumerated	1,087 44
Total	$8,384 61

Expenditures.

Butchers' meat	$518 98
Butter and eggs	486 92
Flour, bread and meal	191 05
Milk	266 78
Tea and coffee	97 38
Potatoes and other vegetables	117 35
Groceries and provisions not enumerated	934 72
Drugs and medicines	240 58
Medical and surgical appliances	327 65
Beer, wine and spirits	14 25
Bedding, napery and general house furnishings	127 21
Brooms, brushes, mops, soap and cleaning appliances	104 09
Fuel	908 90
Light: electric, gas, oil and candles	335 35
Water supply	15 00
Ice supply	26 40
Salaries and wages	2,628 27
Insurance	157 95
Contingencies	11 65
Repairs, ordinary	548 70
Printing, postage, etc.	64 88
Clothing	17 25
Furnishings	80 06
Total	$8,221 37
Government grant for 1916	$442 91

QUEEN VICTORIA MEMORIAL HOSPITAL, NORTH BAY.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	22
Admitted	434
Births in Hospital	66
Total number under treatment	522
Discharged	482
Died	18
Under treatment 30th September, 1916	22
	522

Sex.

Male	306
Female	216
	522

Revenue.

From the Province of Ontario	$854 23
From the Town of North Bay	500 00
From other municipalities	.....
From patients themselves for maintenance and treatment	7,549 97
Subscriptions, donations, etc.	1,577 36
Total	$10,481 56

QUEEN VICTORIA MEMORIAL HOSPITAL, NORTH BAY.—*Continued.*

Expenditures.

Butchers' meat	$892 12
Butter and eggs	667 55
Flour, bread and meal	283 44
Milk	576 72
Tea and coffee	82 41
Potatoes and other vegetables	254 98
Groceries and provisions not enumerated	1,064 00
Drugs and medicines	504 68
Surgical instruments and appliances	255 46
Bedding, napery and general house furnishings	115 28
Brooms, brushes, mops, soap and cleaning appliances	69 85
Fuel	1,112 97
Electric light, gas, oil, candles	123 90
Water supply	22 50
Ice	47 60
Salaries and wages	3,440 54
Contingencies	1,240 33
Repairs, ordinary	271 19
Beer, wine and spirits	30 30
Taxes and insurance	371 85
Printing and postage	106 31
Coffins and funerals	35 00
Total	$11,568 98

Government grant for 1916 .. $763 03

GENERAL HOSPITAL, MIDLAND.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	12
Admitted	165
Births in Hospital	21
Total number under treatment	198
Discharged	174
Died	15
Under treatment, 30th September, 1916	9
	198

Sex.

Male	112
Female	86
	198

Revenue.

From the Province of Ontario	$389 51
From the Town of Midland..	450 00
From the County of Simcoe..	500 00
From other municipalities ..	.....
From patients themselves for maintenance and treatment	3,048 81
From subscriptions, donations and bequests from private individuals	96 92
From other sources	7 90
Total	$4,493 14

Expenditures.

Butchers' meat	$196 11
Butter and eggs	208 70
Flour, bread and meal	128 10
Milk	94 93
Tea and coffee	26 80
Potatoes and other vegetables	4 20
Groceries and provisions not enumerated	323 75
Drugs and medicines	233 20
Surgical instruments and appliances	802 84
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	43 20
Brooms, brushes, mops, soap and cleaning appliances	25 47
Fuel	380 09
Light: electric, gas, oil and candles	53 43
Water supply	21 70
Ice	25 00
Salaries and wages	1,655 82
Printing, stationery, etc.	36 50
Contingencies	53 03
Repairs, ordinary	470 20
Taxes and insurance	22 50
Laundry	445 35
Telephone and telegrams	69 34
Total	$5,320 26

Government grant for 1916 .. $322 13

ST. FRANCIS' HOSPITAL, SMITH'S FALLS.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	26
Admitted	486
Births in Hospital	25
Total number under treatment	537
Discharged	493
Died	16
Under treatment, 30th September, 1916	28
	537

Sex.

Male	255
Female	282
	537

Revenue.

From the Province of Ontario	$708 27
From the Town of Smith's Falls for patients' maintenance	950 00
From the County of Lanark..	.....
From paying patients themselves	5,341 02
From subscriptions, bequests, and donations of private individuals	650 13
From other sources	1,475 00
Total	$9,124 42

Expenditures.

Butchers' meat	$1,274 26
Butter and eggs	821 23
Flour, bread and meal	483 85
Milk	702 32
Tea and coffee	302 28
Potatoes and other vegetables	115 13
Groceries and provisions not enumerated	712 69
Drugs and medicines	239 53
Medical and surgical appliances	254 99
Surgical instruments	.....
Alcohol	53 50
Bedding, napery and general house furnishings	543 78
Brooms, brushes, mops, soap and cleaning appliances	124 60
Fuel	1,200 00
Electric light, motor service..	358 72
Water	25 00
Ice	62 24
Salaries and wages	1,167 78
Taxes, insurance and interest	32 22
Stationery, postage, etc.	77 07
Repairs, ordinary	364 81
Contingencies	47 01
Laundry	.....
Clothing, including boots	155 19
Total	$9,118 20
Government aid for 1916	$867 15

TORONTO FREE HOSPITAL FOR CONSUMPTIVES, WESTON.

(Including Queen Mary Hospital for Consumptive Children, and King Edward Annex.)

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	311
Admitted	453
Births in Hospital	.....
Total number under treatment	764
Discharged	282
Died	183
Under treatment, 30th September, 1916	299
	764

Sex.

Male	483
Female	281
	764

Revenue.

From the Province of Ontario	$47,654 73
From the City of Toronto	85,351 00
From other municipalities	8,469 68
From patients themselves for maintenance and treatment.	4,262 67
From endowments, investments, etc.	388 07

TORONTO FREE HOSPITAL FOR CONSUMPTIVES, WESTON.—*Continued.*

From subscriptions, donations and bequests from private individuals	7,087 76
From other sources	9,123 53
Total	$162,337 44

Expenditures.

Butchers' meat	$20,211 22
Butter and eggs	11,111 22
Flour, bread and meal	3,975 91
Milk	9,133 61
Tea and coffee	1,665 20
Potatoes and other vegetables	4,481 25
Groceries and provisions not enumerated	9,770 15
Drugs and medicines	3,255 51
Laboratory expenses and medical appliances	220 87
Bank interest and exchange	3,735 14
Bedding, napery and general house furnishings	8,431 07
Brooms, brushes, mops, soap and cleaning appliances	1,820 27
Fuel	11,603 03
Electric light, gas, oil and candles	899 61
Laundry	5,821 85
Maintenance of plant	22,183 41
Improving grounds	1,837 02
Advertising, stationery and postage	1,674 64
Ice	477 28
Salaries and wages	45,678 47
Taxes and insurance	595 22
Freight and livery	39 60
Contingencies	187 30
Outside furnishing	357 89
Travelling expenses	278 25
Repairs, ordinary	7,194 94
Head office expenses	4,016 68
Medical staff supplies	38 00
Horse expenses	396 42
Telephones	499 00
General expenses	1,245 80
Dispensary and X-ray	2,560 91
Total	$185,396 74
Government grant for 1916	$48,013 29

MOUNTAIN SANATORIUM, HAMILTON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	93
Admitted	153
Total number under treatment	246
Discharged	132
Died	12
Under treatment, 30th September, 1916	102
	246

Sex.

Male	136
Female	110
	246

Revenue.

From the Province of Ontario	$13,597 29
From the City of Hamilton for patients' maintenance	15,700 03
From paying patients themselves	7,649 39
From endowments, investments, etc.	652 71
From other sources	.....
Total	$37,599 42

Expenditures.

Butchers' meat	$5,083 22
Butter and eggs	3,032 91
Flour, bread and meal	878 19
Milk	2,053 00
Potatoes and other vegetables and fruit	885 02
Groceries and provisions not enumerated	1,596 30
Drugs and medicines	1,904 64
Dispensary work	1,362 98
Brooms, brushes, mops, soap and cleaning appliances; Bedding, napery and general house furnishings	416 89
Fuel	3,410 68
Light: gas, oil and candles	175 34
Farm and stable expenses	111 20
Contingencies	3,652 97
Salaries and wages	12,538 93
Taxes and insurance	195 40
Laundry	100 69
Advertising, stationery and postage, etc.	693 71
Repairs, ordinary	2,532 37
Ice	95 75
Interest	256 25
Water supply	300 00
Total	$41,276 44
Government grant for 1916	$14,936 15

VICTORIAN HOSPITAL, ALMONTE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	8
Admitted	133
Births in Hospital	12
Total number under treatment	163
Discharged	148
Died	8
Under treatment, 30th September, 1916	7
	163

Sex.

Male	57
Female	106
	163

Revenue.

From the Province of Ontario	$270 23
From the Town of Almonte	200 00
From the County of Lanark	100 00
From other municipalities	165 00
From endowments, investments, etc.	458 15
From patients themselves for maintenance and treatment.	2,477 69
From subscriptions, donations and bequests from private individuals	1,043 21
From other sources	28 95
Total	$4,743 23

Expenditures.

Butchers' meat	$239 39
Butter and eggs	172 98
Flour, bread and meal	73 41
Milk	88 25
Tea and coffee	74 20
Potatoes and other vegetables	55 76
Groceries and provisions not enumerated	423 53
Drugs and medicines	158 90
Medical and surgical appliances	54 22
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	.....
Brooms, brushes, mops, soap and cleaning appliances	41 79
Fuel	323 56
Electric light, gas, oil, candles	14 70
Salaries and wages	2,364 11
Taxes and insurance	.....
Contingencies	333 22
Repairs, ordinary	71 59
Ice	20 00
Printing, stationery, etc.	41 39
Total	$4,551 00
Government grant for 1916	$596 86

GENERAL HOSPITAL, NIAGARA FALLS.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	12
Admitted	451
Births in Hospital	41
Total under treatment	504
Discharged	452
Died	25
Under treatment, 30th September, 1916	27
	504

Sex.

Male	267
Female	237
	504

Revenue.

From the Province of Ontario	$1,170 88
From the Town of Niagara Falls	1,500 00
From the County of Welland.	800 00
From other municipalities	250 00
From patients for maintenance and treatment	10,862 14

GENERAL HOSPITAL, NIAGARA FALLS.—*Continued.*

From subscriptions, donations, and bequests from private individuals	398 00
From other sources	1,064 15
Total	$16,045 17

Expenditures.

Butchers' meat	$921 48
Butter and eggs	899 47
Flour, bread and meal	251 53
Milk	583 44
Tea and coffee	110 65
Potatoes and other vegetables	226 26
Groceries and provisions not enumerated	1,129 87
Drugs and medicines	1,451 83
Medical and surgical appliances	452 75
Surgical instruments	51 09
Beer, wine and spirits	18 00
Bedding, napery and general house furnishings	233 11
Brooms, brushes mops, soap and cleaning appliances	88 05
Fuel	800 34
Electric light, gas, oil, candles	180 03
Ice supply	204 06
Salaries and wages	3,427 64
Contingencies	1,117 30
Repairs, ordinary	731 48
Nurses' Home expense	1,130 07
Taxes and insurance	554 19
Interest	.....
Water supply	47 72
Printing and postage	111 61
Ambulance	166 00
Total	$14,887 97
Government grant for 1916	$1,228 49

GENERAL HOSPITAL, WINGHAM.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	9
Admitted	136
Number of births in Hospital	10
Total number under treatment	155
Discharged	140
Died	10
Under treatment, 30th September, 1916	5
	155

Sex.

Male	68
Female	87
	155

Revenue.

From the Province of Ontario	$340 37
From the Town of Wingham	250 00
From the County of Huron	275 75
From other municipalities	.....
From paying patients	4,061 29
Subscriptions, donations, etc.	11 00
Other sources	386 54
Total	$5,324 95

Expenditures.

Butchers' meat	$264 43
Butter and eggs	233 95
Flour, bread and meal	129 45
Milk	138 91
Tea and coffee	45 35
Potatoes and other vegetables	59 18
Groceries and provisions not enumerated	388 69
Drugs and medicines	228 93
Medical and surgical appliances	266 46
Bedding, napery and general house furnishings	325 14
Brooms, brushes mops, soap and cleaning appliances	30 99
Fuel	425 41
Electric light, gas, oil, candles	92 00
Water supply	18 52
Ice	20 00
Salaries and wages	1,527 97
Contingencies	786 88
Repairs, ordinary	174 81
Taxes and insurance	106 97
Printing, stationery, etc.	46 30
Beer, wine and spirits	36 50
Total	$5,346 84
Government grant for 1916	$455 90

GENERAL AND MARINE HOSPITAL, GODERICH.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	6
Admitted	122
Births in Hospital	21
Total number under treatment	149
Discharged	140
Died	6
Under treatment, 30th September, 1916	3
	149

Sex.

Male	63
Female	86
	149

Revenue.

From the Province of Ontario	$364 15
From the Town of Goderich	500 00
From the County of Huron	295 02
From other municipalities	.....
From patients themselves for maintenance and treatment.	2,009 03
From endowments, investments, etc.	30 00
From subscriptions, donations and bequests from private individuals	237 60
From other sources	196 35
Total	$3,632 15

Expenditures.

Butchers' meat	$199 21
Butter and eggs	154 36
Flour, bread and meal	75 94
Milk	72 00
Tea and coffee	22 20
Potatoes and other vegetables	147 38
Groceries and provisions not enumerated	234 66
Drugs and medicines	51 29
Medical and surgical appliances	241 25
Beer, wine and spirits	.....
Surgical instruments	.....
Bedding, napery and general house furnishings	35 61
Brooms, brushes, mops, soap and cleaning appliances	26 60
Fuel	60 78
Electric light, gas, oil, candles	127 32
Water supply	44 40
Salaries and wages	1,585 30
Printing, stationery, etc.	41 49
Insurance	30 00
Ice supply	17 50
Contingencies	522 73
Repairs, ordinary	98 70
Rent	.....
Total	$3,788 72
Government grant for 1916	$322 53

LADY MINTO HOSPITAL, NEW LISKEARD.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	4
Admitted	163
Births in Hospital	8
Total number under treatment	175
Discharged	153
Died	14
Under treatment, 30th September, 1916	8
	175

Sex.

Male	112
Female	63
	175

Revenue.

From the Province of Ontario	$733 96
From the Town of New Liskeard	100 00
From other municipalities	100 00
From Victorian Order	400 00
From patients for maintenance and treatment	2,687 61

LADY MINTO HOSPITAL, NEW LISKEARD.—*Continued.*

From subscriptions, donations and bequests from private individuals	$282 80
From other sources	987 12
Total	$5,291 49

Expenditures.

Butchers' meat	$381 52
Butter and eggs	316 94
Flour, bread and meal	175 62
Milk	233 09
Tea and coffee	67 96
Potatoes and other vegetables.	157 13
Groceries and provisions not enumerated	367 80
Drugs and medicines	65 05
Medical and surgical appliances	20 32
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	143 66
Brooms, brushes, mops, soap and cleaning appliances	64 53
Fuel	293 62
Electric light, gas, oil and power	90 07
Ice supply	25 65
Salaries and wages	2,597 75
Repairs, ordinary	70 85
Coffins and funerals	.....
Printing, stationery, etc.	122 24
Taxes and insurance	156 25
Contingencies	6 50
Total	$5,356 55
Government grant for 1916	$503 56

ROYAL ALEXANDRA HOSPITAL, FERGUS.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	22
Admitted	282
Births in Hospital	24
Total under treatment	328
Discharged	287
Died	26
Under treatment 30th September, 1916	15
	328

Sex.

Male	143
Female	185
	328

Revenue.

From the Province of Ontario	$966 97
From the County of Wellington	2,754 40
From other municipalities	25 00
From patients for maintenance and treatment	10,547 35
From subscriptions, donations and bequests from private individuals	50 00
From all other sources	344 58
Total	$14,688 30

Expenditures.

Butchers' meat	$832 48
Butter and eggs	813 97
Flour, bread and meal	344 94
Milk	266 10
Tea and coffee	64 39
Potatoes and other vegetables.	927 88
Groceries and provisions not enumerated	1,078 25
Drugs and medicines	577 23
Medical and surgical appliances	897 61
Surgical instruments	339 17
Bedding, napery and general house furnishings	1,166 27
Brooms, brushes, mops, soap and cleaning appliances	155 24
Fuel	1,401 43
Electric light, gas, oil, candles	161 91
Ice supply	64 00
Salaries and wages	2,801 76
Insurance and water supply	40 92
Contingencies	410 00
Repairs, ordinary	275 21
Hay, straw and feed	54 59
Printing and stationery	222 50
Freight and express	265 10
Laundry	765 87
Telephone	176 08
Payment on account of liabilities and extras	269 08
Total	$14,371 98
Government grant for 1916	$346 49

GENERAL HOSPITAL, PARRY SOUND.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	17
Admitted	308
Number of births in Hospital.	14
Total number under treatment	339
Discharged	305
Died	19
Under treatment 30th September, 1916	15
	339

Sex.

Male	225
Female	114
	339

Revenue.

From the Province of Ontario	$411 02
From Town of Parry Sound...	.....
From paying patients	5,156 90
Subscriptions, donations, etc..	.....
Other sources	2,489 45
Total	$8,057 37

Expenditures.

Butchers' meat	$555 58
Butter and eggs	680 18
Flour, bread and meal	211 14
Milk	237 50
Tea and coffee	110 68
Potatoes and other vegetables	146 45
Groceries and provisions not enumerated	687 84
Drugs and medicines	296 15
Medical and surgical appliances	1,246 36
Surgical instruments	76 13
Beer, wine and spirits	74 37
Bedding, napery and general house furnishings	780 45
Brooms, brushes, soap and cleaning	67 27
Fuel	318 68
Electric light, gas, oil	143 73
Water supply	49 50
Ice supply	21 00
Printing, stationery, etc.	.....
Salaries and wages	2,184 00
Contingencies	.....
Repairs, ordinary	125 00
Taxes and insurance	45 36
Total	$8,057 37
Government grant for 1916	$856 25

GENERAL HOSPITAL, ORILLIA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	19
Admitted	517
Births in Hospital	30
Total number under treatment	566
Discharged	532
Died	24
Under treatment 30th September, 1916	10
	566

Sex.

Male	330
Female	236
	566

Revenue.

From the Province of Ontario	$1,219 66
From the Town of Orillia....	500 00
From the County of Simcoe..	500 00
From patients themselves for maintenance and treatment.	8,302 48
From subscriptions, donations and bequests from private individuals	6 00
From other sources	331 55
Total	$10,859 69

Expenditures.

Butchers' meat	$628 62
Butter and eggs	551 48
Flour, bread and meal	362 29
Milk	510 59
Groceries and provisions not enumerated	1,207 29
Drugs and medicines	359 70

GENERAL HOSPITAL, ORILLIA.—*Continued.*

Medical and surgical appliances	870 77
Bedding, napery and general house furnishings	113 97
Brooms, brushes, mops, soap and cleaning appliances	.....
Fuel	193 63
Electric light, gas, oil and candles	157 81
Water supply	41 60
Ice	$40 00
Salaries and wages	3,247 53
Taxes and insurance	78 32
Contingencies	1,294 15
Repairs, ordinary	223 70
Printing, stationery, etc.	55 45
Total	$9,936 90
Government grant for 1916	$1,289 32

GENERAL HOSPITAL, WELLAND.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	25
Admitted	929
Number of births in Hospital.	33
Total number under treatment	987
Discharged	902
Died	55
Under treatment, 30th September, 1916	30
	987

Sex.

Male	683
Female	304
	987

Revenue.

From the Province of Ontario	$1,634 33
From the Town of Welland	.....
From the County of Welland.	1,600 00
From other municipalities	.....
From paying patients	13,640 03
Subscriptions, donations, etc.	380 00
Other sources	141 94
Recepits from ambulance	.....
Total	$17,396 30

Expenditures.

Butchers' meat	$801 84
Butter and eggs	662 38
Flour, bread and meal	219 97
Milk	642 71
Tea and coffee	77 65
Potatoes and other vegetables.	225 70
Groceries and provisions not enumerated	467 72
Drugs and medicines	910 69
Medical and surgical appliances	600 03
Surgical instruments	62 42
Beer, wine and spirits	16 20
Bedding, house furnishings, etc.	32 13
Brooms, brushes, mops, soap and cleaning appliances	113 08
Fuel	363 99
Electric light, gas, oil, candles	460 04
Ice	112 84
Salaries and wages	3,645 91
Contingencies	63 96
Repairs, ordinary	90 59
Water supply	50 87
Printing, postage and stationery	168 00
Telephone and electricity	78 74
Taxes and insurance	.....
Clothing for patients	.....
Ambulance expenses	198 00
Total	$10,025 86
Government grant for 1916	$2,013 67

RAILWAY, MARINE AND GENERAL HOSPITAL, PORT ARTHUR.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	29
Admitted	620
Births in Hospital	31
Total number under treatment	680

RAILWAY, MARINE AND GENERAL HOSPITAL, PORT ARTHUR.—*Continued.*

Discharged	627
Died	22
Under treatment, 30th September, 1916	31
	680

Sex.

Male	484
Female	196
	680

Revenue.

From the Province of Ontario	$1,574 14
From the City of Port Arthur	9,573 87
From patients themselves for maintenance and treatment.	11,276 90
From subscriptions, donations and bequests from private individuals	2,226 15
From other sources	15 10
Total	$24,666 16

Expenditures.

Butchers' meat	$784 45
Butter and eggs	1,080 64
Flour, bread and meal	410 13
Milk	598 65
Tea and coffee	151 03
Potatoes and other vegetables	320 35
Groceries and provisions not enumerated	723 07
Drugs and medicines	474 81
Surgical and medical appliances	487 15
Beer, wine and spirits	77 80
Bedding, napery and general house furnishings	32 95
Fuel	1,386 63
Brooms, brushes, mops, soap and cleaning appliances	233 07
Electric light, gas, oil, candles	54 73
Water supply	35 55
Ice	89 58
Salaries and wages	4,941 58
Taxes and insurance	250 66
Stationery, printing, etc.	176 48
Contingencies	123 34
Repairs, ordinary	1,020 51
Surgical instruments	12 03
Nurses' books	26 65
Total	$13,491 84
Government grant for 1916	$1,655 12

GENERAL HOSPITAL, INGERSOLL.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	6
Admitted	175
Births in Hospital	34
Total number under treatment	215
Discharged	186
Died	14
Under treament 30th September, 1916	15
	215

Sex.

Male	80
Female	135
	215

Revenue.

From the Province	$607 13
From the Town of Ingersoll	1,000 00
From the County of Oxford	500 00
From patients themselves for maintenance and treatment.	4,170 45
From subscriptions, donations, and bequests from private individuals	180 50
From other sources	10 00
Total	$6,468 08

Expenditures.

Butchers' meat	$561 83
Butter and eggs	.....
Bread	106 00
Milk	163 30
Tea and coffee	.....
Potatoes and other vegetables.	.....
Groceries and provisions not enumerated	1,020 18
Drugs and medicines	402 17
Medical and surgical appliances	.....
Bedding, napery and general house furnishings	41 25
Brooms, brushes, mops, soap and cleaning appliances	53 45

GENERAL HOSPITAL, INGERSOLL.—*Continued.*

Fuel	678 00
Electric light, gas, oil, candles	110 42
Salaries and wages	1,897 82
Insurance and taxes	.....
Contingencies	40 13
Repairs, ordinary	314 90
Ice	72 00
Water	72 17
Advertising and printing	15 71
Total	$5,549 33
Government grant for 1916	$488 52

GENERAL HOSPITAL, KINCARDINE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	7
Admitted	92
Births in Hospital	12
Total number under treatment	111
Discharged	102
Died	5
Under treatment, 30th September, 1916	4
	111

Sex.

Male	51
Female	60
	111

Revenue.

From the Province of Ontario	$197 47
From the Town of Kincardine	200 00
From patients for maintenance and treatment	2,128 70
From subscriptions, donations, and bequests from private individuals	499 20
From other sources	1,326 50
Total	$4,351 87

Expenditure.

Butchers' meat	$321 90
Butter and eggs	159 28
Flour, bread and meal	117 28
Milk	24 07
Tea and coffee	43 15
Potatoes and other vegetables	37 18
Groceries and provisions not enumerated	339 59
Drugs and medicines	230 97
Medical and surgical appliances	201 82
Bedding, napery and general house furnishings	.....
Brooms, brushes, mops, soap and cleaning appliances	35 35
Fuel	511 85
Electric light, gas, oil, candles	1 75
Beer, wine and spirits	.....
Ice supply	.....
Salaries and wages	1,665 00
Contngencies	164 79
Repairs, ordinary	105 97
Hay and straw	112 93
Printing and postage	60 38
Taxes and insurance	49 42
Total	$4,182 68
Government grant for 1916	$190 66

COTTAGE HOSPITAL, COBOURG.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	11
Admitted	387
Births in Hospital	18
Total number under treatment	416
Discharged	386
Died	21
Under treatment, 30th September, 1916	9
	416

COTTAGE HOSPITAL, COBOURG.—*Continued.*

Sex.

Male	263
Female	153
	416

Revenue.

From the Province of Ontario	$646 51
From the Town of Cobourg	800 00
From the Counties of Northumberland and Durham	200 00
From other municipalities in the Province	212 00
From paying patients themselves	7,363 08
From endowments, investments, etc.	.....
From subscriptions, donations, etc.	713 50
From other sources	115 25
Total	$10,050 34

Expenditures.

Butchers' meat and fish	$812 66
Butter and eggs	355 51
Flour, bread and meal	180 87
Milk	304 57
Tea and coffee	92 91
Potatoes and other vegetables	123 37
Groceries and provisions not enumerated	436 68
Drugs and medicines	145 66
Medical and surgical appliances	270 67
Bedding, napery and general house furnishings	696 96
Brooms, brushes, mops, soap and cleaning appliances	110 07
Fuel	861 10
Water	61 13
Electric light, gas, oil	156 95
Salaries and wages	2,542 55
Contingencies	1,529 45
Repairs, ordinary	160 10
Printing, stationery, postage, etc.	114 26
Ice	25 00
Insurance	306 00
Clothing for patients	.....
Wine and spirits	.....
Total	$9,286 47
Government grant for 1916	$1,041 41

CHARLOTTE ELEANOR ENGLEHART HOSPITAL, PETROLIA

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	16
Admitted	171
Number of births in Hospital	18
Total number under treatment	205
Discharged	180
Died	16
Under treatment 30th September, 1916	9
	205

Sex.

Male	82
Female	123
	205

Revenue.

From the Province of Ontario	$677 69
From the Town of Petrolia	1,000 00
From the County of Lambton	900 00
From paying patients	4,381 82
Subscriptions, donations, etc.	59 00
From other sources	2,342 96
Total	$9,361 47

Expenditures.

Butchers' meat and fish	$295 81
Butter and eggs	433 18
Flour, bread and meal	.....
Milk	.....
Tea and coffee	.....
Potatoes and other vegetables	.....
Groceries and provisions not enumerated	1,113 11
Drugs and medicines	229 72
Medical and surgical appliances	342 35
Beer, wine and spirits	45 05

CHARLOTTE ELEANOR ENGLEHART HOSPITAL, PETROLIA.—*Continued.*

Bedding, napery and general house furnishings	427 54
Brooms, brushes, mops, soap and cleaning appliances	.....
Fuel	426 78
Electric light, gas, oil, candles	174 19
Water supply	.....
Hay and straw	98 82
Salaries and wages	3,091 36
Contingencies	687 05
Repairs, ordinary	292 00
Laundry	656 18
Printing, stationery and postage	63 22
Maintenance of grounds	343 21
Ice	34 32
Taxes and insurance	.....
Total	$8,753 89
Government aid for 1916	$750 68

GENERAL HOSPITAL, OSHAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	25
Admitted	560
Number of births in Hospital	39
Total number under treatment	624
Discharged	562
Died	31
Under treatment, 30th September, 1916	31
	624

Sex.

Male	324
Female	300
	624

Revenue.

From the Province of Ontario	$1,136 01
From the Town of Oshawa	500 00
From the County of Ontario	600 00
From paying patients	11,030 12
Subscriptions, donations, etc.	1,765 06
Total	$15,031 19

Expenditures.

Butchers' meat and fish	$749 44
Butter and eggs	546 49
Flour, bread and meal	317 53
Milk	461 13
Tea and coffee	95 30
Potatoes and other vegetables	14 70
Groceries and provisions not enumerated	892 76
Drugs and medicines	493 58
Medical and surgical appliances	711 14
Beer, wine and spirits	15 00
Bedding, napery and general house furnishings	138 20
Brooms, brushes, mops, soap and cleaning appliances	138 15
Fuel	757 75
Electric light, gas, oil, candles	474 51
Water supply	79 21
Ice	73 20
Salaries and wages	4,201 22
Contingencies	1,027 75
Repairs, ordinary	240 96
Surgical instruments	.....
Printing, stationery and postage	68 48
Taxes and insurance	162 62
Total	$11,659 12
Government aid for 1916	$1,465 31

CONSUMPTIVE SANATORIUM, ST. CATHARINES.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	11
Admitted	25
Total number under treatment	36
Discharged	15
Died	8
Under treatment 30th September, 1916	13
	36

CONSUMPTIVE SANATORIUM, ST. CATHARINES.—*Continued.*

Sex.

Male	19
Female	17
	36

Revenue.

From the Province of Ontario	$1,713 86
From the City of St. Catharines	1,382 25
From other municipalities	831 10
From patients themselves	402 90
From endowments, investments, etc.	82 86
From subscriptions, bequests and donations of private individuals	35 00
From other sources	94 69
Total	$4,542 66

Expenditures.

Butchers' meat	$460 12
Butter and eggs	165 21
Flour, bread and meal	93 03
Milk	97 82
Tea and coffee	53 10
Potatoes and other vegetables	171 62
Groceries and provisions not enumerated	242 85
Drugs and medicines	192 20
Bedding, napery and general house furnishings	140 34
Brooms, brushes, mops, soap and cleaning appliances	56 46
Fuel	192 77
Electric light, oil, candles	36 22
Ice	49 00
Salaries and wages	1,589 55
Taxes and insurance	84 00
Contingencies	250 84
Repairs, ordinary	118 56
Water supply	10 80
Hay and straw	46 20
Beer, wine and spirits	1 05
Printing and postage	48 70
Total	$4,100 44
Government grant for 1916	$1,146 86

ROYAL SANATORIUM, OTTAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	56
Admitted	146
Total number under treatment	202
Discharged	96
Died	45
Under treatment 30th September, 1916	61
	202

Sex.

Male	97
Female	105
	202

Revenue.

From the Province of Ontario	$8,313 00
From the City of Ottawa	23,026 71
From paying patients	2,229 95
From all other sources	.....
Total	$33,569 66

Expenditures.

Butchers' meat, poultry and fish	$2,910 03
Butter and eggs	1,596 24
Flour, bread and meal	774 11
Milk	1,309 15
Tea and coffee	229 42
Potatoes and other vegetables	889 49
Groceries and provisions not enumerated	935 89
Brooms, brushes, soap and cleaning appliances	294 86
Drugs, medicines and appliances	911 62
Beer, wine and spirits	58 80
Surgical instruments	759 03
Bedding, napery and general house furnishings	1,269 02
Fuel	3,412 37
Electric light, gas, oil and candles	709 79
Water supply	.....
Ice supply	255 88
Salaries and wages	13,611 48
Contingencies	1,044 67
Repairs, ordinary	1,383 03
Taxes and insurance	877 29
Stationery, postage, etc.	83 09
Other expenditures, not enumerated	254 40
Total	$33,569 66
Government grant for 1916	$9,139 72

QUEEN ALEXANDRA SANATORIUM, LONDON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st, October, 1915	73
Admitted	136
Total number under treatment	209
Discharged	134
Died	.....
Under treatment 30th September, 1916	75
	209

Sex.

Male	120
Female	89
	209

Revenue.

From the Province of Ontario	$8,232 00
From the City of London	8,665 40
From the County of Middlesex	613 00
From other municipalities	5,523 53
From patients themselves for maintenance and treatment.	3,420 68
From subscriptions, donations and bequests from private individuals	1,892 00
From other sources	4,919 38
Total	$33,265 99

Expenditures.

Butchers' meat	$3,339 80
Butter and eggs	1,690 67
Flour, bread and meal	702 68
Milk	47 06
Tea and coffee	233 45
Potatoes and other vegetables	487 54
Groceries and provisions not enumerated	1,557 01
Drugs and medicines	197 86
Medical and surgical appliances	392 24
Surgical instruments	.....
Beer, wine and spirits	5 25
Bedding, napery and general house furnishings	614 70
Brooms, brushes, mops, soap and cleaning appliances	750 12
Fuel	1,677 92
Electric light, gas, oil, candles	364 83
Salaries and wages	8,924 67
Taxes and insurance	110 00
Contingencies	265 84
Farm	2,182 47
Stable supplies	1,772 05
Ice supply	198 40
Printing, stationery, postage, etc.	229 06
Repairs, ordinary	1,754 84
Church service	64 00
Clothing for patients	50 40
Visiting nurses' expenses	899 45
Total	$28,512 31
Government grant for 1916	$10,743 43

GENERAL HOSPITAL, PENETANGUISHENE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	5
Admitted	141
Births in Hospital	29
Total number under treatment	175
Discharged	166
Died	4
Under treatment 30th September, 1916	5
	175

Sex.

Male	77
Female	98
	175

Revenue.

From the Province	$270 11
From the Town of Penetang.	300 00
From the County of Simcoe..	500 00
From other municipalities....	.....
From patients themselves for maintenance and treatment.	1,831 70

GENERAL HOSPITAL, PENETANGUISHENE.—*Continued.*

From subscriptions, donations and bequests from private individuals	95 00
From other sources	695 15
Total	$3,691 96

Expenditure.

Butchers' meat	$171 92
Butter and eggs	115 99
Flour, bread and meal	73 74
Milk	125 99
Tea and coffee	.....
Potatoes and other vegetables.	.....
Groceries and provisions not enumerated	740 22
Drugs and medicines	320 68
Medical and surgical appliances	.....
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	.....
Brooms, brushes, mops, soap and cleaning appliances	84 00
Fuel	287 28
Light: gas, oil and candles	44 28
Salaries and wages	1,248 20
Taxes and insurance	.....
Contingencies	65 51
Laundry, etc.	322 29
Ice	.....
Repairs, ordinary	106 45
Printing and postage	.....
Payment of note	.....
Total	$3,706 55
Government grant for 1916	$330 81

PUBLIC HOSPITAL, SMITH'S FALLS.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	22
Admitted	487
Births in Hospital	44
Total number under treatment	553
Discharged	482
Died	33
Under treatment, 30th September, 1916	38
	553

Sex.

Male	228
Female	325
	553

Revenue.

From the Province of Ontario.	$1,218 25
From the Town of Smith's Falls	1,200 00
From patients themselves for maintenance and treatment	12,852 23
From subscriptions, donations and bequests from private individuals	305 75
From other sources	7,775 49
From endowments, investments, etc.	973 00
Total	$24,324 72

Expenditures.

Butchers' meat	$1,127 08
Butter and eggs	943 42
Flour. bread and meal	420 74
Milk	336 65
Potatoes and other vegetables	160 75
Groceries and provisions not enumerated	385 46
Tea and coffee	1,016 63
Drugs and medicines	1,366 58
Medical and surgical appliances	830 44
Surgical instruments	14 10
Bedding, napery and general house furnishings	388 14
Brooms, brushes, mops, soap and cleaning appliances	109 85
Fuel	1,900 37
Light: Gas, oil and power	599 15
Laundry	251 39
Ice	113 50
Salaries and wages	5,007 87
Taxes and insurance	177 71
Contingencies	158 17
Repairs, ordinary	308 41
Printing, stationery, etc.	252 92
Hay and straw	89 07
Beer, wine and spirits	93 40
Water supply	18 75
Payments on liabilities	7,917 66
Total	$23,988 21
Government grant for 1916	$1,557 06

GENERAL HOSPITAL, ORANGEVILLE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	7
Admitted	118
Births in Hospital	20
Total number under treatment	145
Discharged	116
Died	22
Under treatment, 30th September, 1916	7
	145

Sex.

Male	44
Female	101
	145

Revenue.

From the Province of Ontario	$356 72
From the Town of Orangeville	.....
From the County of Dufferin.	300 00
From other municipalities ..	.....
From patients for maintenance and treatment	3,406 28
From endowments, investments, etc.	.....
From subscriptions, donations, and bequests from private individuals	176 00
From other sources	645 92
Total	$4,884 92

Expenditures.

Butchers' meat	$238 50
Butter and eggs	293 18
Flour, bread and meal	214 97
Milk	221 05
Tea and coffee	55 00
Potatoes and other vegetables	125 00
Groceries and provisions not enumerated	604 24
Drugs and medicines	399 71
Medical and surgical appliances	.....
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	31 42
Brooms, brushes, mops, soap and cleaning appliances	82 36
Fuel	325 00
Light: Gas, oil and candles	132 91
Water	.....
Ice supply	12 00
Salaries and wages	1,284 00
Laundry	303 75
Contingencies	249 00
Repairs, ordinary	72 73
Printing, stationery and postage	21 25
Taxes and insurance	30 50
Telephone	36 00
Total	$4,732 57
Government grant for 1916	$314 98

GENERAL HOSPITAL, PORT HOPE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	6
Admitted	341
Births in Hospital	20
Total number under treatment	367
Discharged	350
Died	11
Under treatment, 30th September, 1916	6
	367

Sex.

Male	266
Female	101
	367

Revenue.

From the Province of Ontario	$399 13
From City of Port Hope	509 78
From County of Durham	200 00
From other municipalities	100 00
From endowments, investments, etc.	900 95

GENERAL HOSPITAL, PORT HOPE.—*Continued.*

From patients themselves for maintenance and treatment	4,591 29
From subscriptions, donations and bequests from private individuals	221 00
From other sources	105 50
Total	$7,027 65

Expenditures.

Butchers' meat	$318 77
Butter and eggs	266 80
Bread	129 15
Milk	72 00
Tea and coffee	29 45
Potatoes and other vegetables	153 32
Groceries and provisions not enumerated	222 22
Drugs and medicines, medical and surgical appliances	173 80
Bedding, napery and general house furnishings	281 80
Brooms, brushes, mops, soap and cleaning appliances	36 75
Fuel	489 97
Light: gas, oil and candles	87 30
Salaries and wages	3,608 75
Insurance and taxes	83 85
Contingencies	71 39
Repairs, ordinary	9 58
Ice	24 40
Water	32 21
Printing, stationery, postage	65 44
Hay and straw	94 47
Beer, wine and spirits	16 76
Medical and surgical appliances	345 50
Total	$6,613 68
Government grant for 1916	$721 06

GENERAL HOSPITAL, BOWMANVILLE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	11
Admitted	247
Births in Hospital	21
Total under treatment	279
Discharged	254
Died	15
Under treatment, 30th September, 1916	10
	279

Sex.

Male	146
Female	133
	279

Revenue.

From the Province of Ontario	$673 52
From Town of Bowmanville	600 00
From County of Durham	200 00
From patients for maintenance and treatment	5,540 09
From subscriptions, donations, and bequests from private individuals	618 00
From all other sources	726 44
Total	$8,358 05

Expenditures.

Butchers' meat	$630 69
Butter and eggs	333 71
Flour, bread and meal	156 43
Milk	14 21
Tea and coffee	14 45
Potatoes and other vegetables	6 16
Groceries and provisions not enumerated	727 49
Drugs and medicines	352 97
Medical and surgical appliances	103 10
Surgical instruments	107 61
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	478 66
Brooms, brushes, mops, soap and cleaning appliances	12 23
Fuel	502 20
Light: gas, oil and candles	239 05
Ice supply	25 00
Salaries and wages	1,794 00
Stationery, printing, postage, etc.	78 12
Contingencies	739 08
Repairs, ordinary	147 75
Laundry	904 70
Taxes and insurance	62 14
Hay and straw	33 08
Water supply	20 52
Total	$7,483 35
Government grant for 1916	$718 97

SIR OLIVER MOWAT MEMORIAL SANATORIUM, KINGSTON.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	24
Admitted	66
Number of births	....
Total number under treatment	90
Discharged	54
Died	16
Under treatment, 30th September, 1916	20
	90

Sex.

Male	56
Female	34
	90

Revenue.

From the Province of Ontario	$2,826 86
From the City of Kingston	1,000 00
From other municipalities	500 00
From patients themselves for maintenance and treatment.	7,627 86
From subscriptions, donations and bequests from private individuals	1,854 28
From other sources	145 83
Total	$13,954 83

Expenditures.

Butchers' meat	$1,059 49
Butter and eggs	1,371 51
Bread	380 59
Milk	.....
Tea and coffee	70 54
Potatoes and other vegetables	56 16
Groceries and provisions not enumerated	1,131 85
Drugs and medicines	369 07
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	183 32
Brooms, brushes, mops, soap and cleaning appliances	75 78
Fuel	1,070 65
Electric light, gas, oil, candles	161 97
Salaries and wages	3,045 50
Insurance and taxes	124 25
Contingencies	1,270 82
Repairs, ordinary	667 60
Hay and straw	361 59
Printing, stationery, etc.	62 63
Total	$11,463 32
Government grant for 1916	$3,707 15

BRANT SANATORIUM, BRANTFORD.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	14
Admitted	38
Total number under treatment	52
Discharged	28
Died	8
Under treatment, 30th September, 1916	16
	52

Sex.

Male	25
Female	27
	52

Revenue.

From the Province of Ontario	$1,446 86
From the City of Brantford	3,969 80
From the County of Brant	.....
From other municipalities of the Province	82 80
From paying patients	592 79
Subscriptions, donations, etc.	.....
Other sources	.....
Total	$6,092 25

Expenditures.

Butchers' meat and fish	$610 57
Butter and eggs	327 98
Flour, bread and meal	97 96
Milk	395 56
Tea and coffee	7 75
Potatoes and other vegetables	184 00
Groceries and provisions not enumerated	252 08

BRANT SANATORIUM, BRANTFORD.—*Continued.*

Drugs and medicines	179 75
Medical and surgical appliances	10 82
Surgical instruments	.....
Beer, wine and spirits	.....
Bedding, napery and general furnishings	186 69
Brooms, brushes, mops, soap and cleaning appliances	34 77
Fuel	637 28
Electric light, gas, oil, candles	132 72
Water supply	20 00
Salaries and wages	2,152 40
Taxes, interest and insurance	65 50
Contingencies	62 71
Repairs, ordinary	157 97
Ice supply	165 00
Clothing for patients	.....
Printing, stationery, etc.	72 13
Total	$5,753 64
Government aid for 1916	$2,070 86

THE PREVENTORIUM, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	28
Admitted	128
Total number under treatment	156
Discharged	118
Died	.....
Under treatment, 30th September, 1916	38
	156

Sex.

Male	77
Female	79
	156

Revenue.

From the Province of Ontario	$5,907 00
From City of Toronto	9,039 80
From patients themselves for maintenance and treatment.	69 00
From property belonging to Hospital, endowments, etc.	.....
From subscriptions, donations, and bequests from private individuals	48 59
From all other sources, not above enumerated	52 44
Total	$15,116 83

Expenditures.

Butchers' meat	$654 06
Butter and eggs	593 06
Flour, bread and meal	331 47
Milk	1,279 88
Tea and coffee	27 00
Potatoes and other vegetables	249 43
Groceries and provisions not enumerated	563 75
Drugs and medicines	107 61
Surgical instruments and appliances	.....
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	721 88
Brooms, brushes, mops, soap and cleaning appliances	49 82
Fuel	752 28
Electric light, gas, oil, candles	400 53
Water supply	5 88
Clothing for patients	504 62
Ice	47 40
Salaries and wages	3,982 78
Taxes and insurance	16 67
Contingencies	405 60
Printing, stationery, etc.	59 71
Repairs, ordinary	1,006 02
Total	$11,759 45
Government grant for 1916	$5,990 15

ESSEX TUBERCULOSIS HOSPITAL, KINGSVILLE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	15
Admitted	41
Total number under treatment	56
Discharged	35
Died	2
Under treatment, 30th September, 1916	19
	56

Sex.

Male	28
Female	28
	56

Revenue.

From the Government of Ontario for maintenance	$2,069 58
From the County of Essex	500 00
From the City of Windsor	1,577 00
From other municipalities	901 98
From paying patients	4,093 05
From subscriptions, bequests and donations from private individuals	2,844 49
From other sources not enumerated	289 30
Total	$12,275 40

Expenditure.

Butchers' meat and fish	$887 07
Butter and eggs	639 87
Flour, bread and meal	237 79
Milk	550 51
Tea and coffee	61 29
Potatoes and other vegetables	253 35
Groceries and provisions not enumerated	378 29
Drugs and medicines	292 24
Medical and surgical appliances	.....
Bedding, napery and general house furnishings	644 38
Brooms, brushes, mops, soap and cleaning appliances	57 35
Fuel	386 52
Electric light, gas, oil, candles	74 48
Water supply	118 88
Ice supply	65 04
Salaries and wages	4,251 77
Taxes, insurance and interest	167 59
Contingencies	763 80
Repairs, ordinary	223 91
Printing, stationery, etc.	65 25
Total	$10,119 38
Government grant for 1916	$2,831 58

PROVIDENCE HOSPITAL, HAILEYBURY.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	16
Admitted	767
Births in Hospital	15
Total number under treatment	798
Discharged	721
Died	34
Under treatment 30th September, 1916	43
	798

Sex.

Male	432
Female	366
	798

Revenue.

From Government of Ontario	$1,488 87
From Town of Haileybury	866 75
From patients for maintenance and treatment	11,895 30
From other municipalities	791 00
From subscriptions, bequests and donations of private individuals	583 00
From other sources	3,032 02
Income from endowments, etc.	506 83
Total	$19,163 77

Expenditures.

Butchers' meat	$1,380 80
Butter and eggs	1,174 50
Flour, bread and meal	394 46
Milk	1,134 63

PROVIDENCE HOSPITAL, HAILEYBURY. *Continued.*

Tea and coffee	706 85
Potatoes and other vegetables	752 06
Groceries and provisions not enumerated	750 40
Drugs, medicines	904 20
Medical and surgical appliances and surgical instruments	582 32
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	1,139 00
Brooms, brushes, etc.	362 72
Fuel	1,378 47
Electric light, gas, oil, candles	284 87
Water supply	.....
Printing, stationery, etc.	486 72
Hay and straw	189 90
Ice	49 42
Salaries and wages	2,158 00
Taxes and insurance	170 00
Repairs, ordinary	306 15
Contingencies	948 87
Clothing for patients	1,280 17
Total	$16,534 51
Government grant for 1916	$1,878 19

LADY MINTO HOSPITAL, CHAPLEAU.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	7
Admitted	140
Births in Hospital	25
Total number under treatment	172
Discharged	160
Died	8
Under treatment 30th September, 1916	4
	172

Sex.

Male	101
Female	71
	172

Revenue.

From the Province of Ontario	$350 40
From the Town of Chapleau	500 00
From patients themselves for maintenance and treatment.	3,164 75
From subscriptions, donations and bequests from private individuals	1,159 90
From other sources	.....
Total	$5,175 05

Expenditures.

Butchers' meat and fish	$310 22
Butter and eggs	.....
Milk	213 50
Tea and coffee	.....
Potatoes and other vegetables	.....
Groceries and provisions not enumerated	889 70
Drugs and medicines	.....
Surgical and medical appliances	62 68
Beer, wine and spirits	.....
Bedding, napery and general house furnishings	9 81
Fuel	758 53
Brooms, brushes, mops, soap and cleaning appliances	.....
Electric light, gas, oil and power	77 65
Water supply	75 00
Ice	58 50
Salaries and wages	2,334 55
Taxes and insurance, telephone and power	.....
Stationery, printing, etc.	12 18
Contingencies	.....
Repairs, ordinary	136 76
Hay and straw	.....
Total	$4,939 08
Government grant for 1916	$348 14

GENERAL HOSPITAL, STRATHROY.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment, 1st October, 1915	12
Admitted	148
Number of births in the institution during the year	16
Total number under treatment	176
Discharged	154
Died	7
Under treatment, 30th September, 1916	15
	176

Sex.

Male	88
Female	88
	176

Revenue.

Received from the Province of Ontario	$486 86
From the Town of Strathroy.	.....
From the County of Middlesex	1,178 00
From paying patients	6,199 98
Subscriptions, donations, etc..	.....
From sources not enumerated.	.....
Total	$7,864 84

Expenditures.

Butchers' meat	$342 55
Butter and eggs	189 12
Flour, bread and meal	130 94
Milk	118 39
Tea and coffee	51 90
Potatoes and other vegetables	146 27
Groceries and provisions not enumerated	377 18
Drugs and medicines	247 24
Medical and surgical appliances	360 16
Beer, wine and spirits	6 19
Bedding, napery and general house furnishings	24 85
Brooms, brushes, mops, etc.	43 75
Fuel	457 22
Electric light, gas, oil, candles	49 82
Water supply	.....
Ice	15 95
Salaries and wages	2,023 06
Contingencies	121 56
Repairs, ordinary	144 12
Taxes and insurance	55 00
Printing, stationery, etc.	59 65
Surgical instruments	12 45
Hay and straw	120 00
Total	$5,097 37
Government grant for 1916	$533 11

WOMEN'S COLLEGE HOSPITAL, TORONTO.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	12
Number admitted	248
Births in Hospital	97
Total number under treatment	357
Discharged	332
Died	5
Under treatment 30th September, 1916	20
	357

Sex.

Male	.....
Female	357
	357

Revenue.

From the Province of Ontario	.....
From the City of Toronto	$2,062 50
From the County of York	.....
From other municipalities of the Province	66 00
From paying patients	6,448 10
From property belonging to the Hospital	.....
From subscriptions, bequests and donations from private individuals	944 57
From other sources not enumerated	1,077 22
Total	$10,598 39

Expenditures.

Butchers' meat	$420 27
Butter and eggs	401 03

WOMEN'S COLLEGE HOSPITAL, TORONTO.—*Continued.*

Flour, bread and meal	120 66	Electric light, gas, oil, candles	155 32
Milk	335 42	Water supply	61 10
Tea and coffee	41 57	Ice supply	21 60
Potatoes and other vegetables.	291 51	Salaries and wages	3,534 92
Groceries and provisions not enumerated	1,033 45	Taxes and insurance	95 20
Drugs and medicines	1,226 19	Contingencies	179 06
Medical and surgical appliances	486 87	Repairs, ordinary	86 75
Bedding, napery and general house furnishings	364 28	Laundry	611 75
Brooms, brushes, mops, soap and cleaning appliances	39 75	Printing, stationery, etc.	149 54
Fuel	488 20	Surgical instruments	418 39
		Total	$10,562 83
		Government grant for 1916	$1,139 99

LADY MINTO HOSPITAL, COCHRANE.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	.....
Admitted	92
Births in Hospital	9
Total number under treatment	101
Discharged	78
Died	8
Under treatment 30th September, 1916	15
	101

Sex.

Male	63
Female	38
	101

Revenue.

From the Province of Ontario.	.....
From the Town of Cochrane..	.....
From patients themselves for maintenance and treatment.	$417 00
From property belonging to Hospital, endowments, etc...	.....
From subscriptions, donations, and bequests from private individuals	428 97
From other sources	470 25
Total	$1,316 22

Expenditures.

Butchers' meat	$178 63
Butter and eggs	113 71
Flour, bread and meal	64 79
Milk	76 91
Tea and coffee	19 30
Potatoes and other vegetables	55 33
Groceries and provisions not enumerated	263 99
Drugs and medicines	100 80
Surgical instruments and appliances	.....
Beer, wine and spirits	59 10
Bedding, napery and general house furnishings	.....
Brooms, brushes, mops, soap and cleaning appliances	12 30
Fuel	184 10
Electric light, gas, oil, candles	62 07
Water supply	.....
Clothing for patients	.....
Ice	61 40
Salaries and wages	1,289 98
Taxes and insurance	47 40
Hay and straw	.....
Contingencies	241 11
Printing, stationery, etc.	39 04
Repairs, ordinary	.....
Total	$2,869 96
Government grant for 1916	$230 50

MISERICORDIA MATERNITY HOSPITAL, OTTAWA.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	139
Admitted	356
Births in Hospital	199
Total number under treatment	694

MISERICORDIA MATERNITY HOSPITAL, OTTAWA.—*Continued.*

Discharged	433
Died	136
Under treatment 30th September, 1916	125
	694

Sex.

Male	210
Female	484
	694

Revenue.

From the Province of Ontario	$1,823 49
From the City of Ottawa	2,500 00
From the County of Carleton	50 00
From patients themselves for maintenance and treatment	3,629 85
Subscriptions, donations and bequests	3,607 75
From other sources not enumerated	5,384 30
Total	$16,995 39

Expenditures.

Butchers' meat	$1,621 15
Butter and eggs	1,456 96
Flour, bread and meal	1,249 34
Milk	2,072 37
Tea and coffee	288 77
Potatoes and other vegetables	880 94
Groceries and provisions not enumerated	2,106 89
Drugs and medicines	448 98
Medical and surgical appliances	346 26
Surgical instruments	22 63
Beer, wine and spirits	38 50
Bedding, napery and general house furnishings	580 84
Brooms, brushes, mops, soap and cleaning appliances	242 05
Fuel	2,775 22
Light: gas, oil and candles	595 84
Water supply	588 41
Hay and straw	131 10
Clothing for patients, including boots and shoes	1,193 97
Ice	91 78
Salaries and wages	2,125 30
Taxes and insurance	462 50
Contingencies	222 55
Repairs, ordinary	724 79
Printing, stationery, etc.	125 25
Coffins and funerals	27 25
Total	$20,419 64

Government grant for 1916 .... $2,601 95

ST. JOSEPH'S GENERAL HOSPITAL, PARRY SOUND.

The following summaries show the operations of the Hospital during the official year:

Movements of Patients.

Number under treatment 1st October, 1915	17
Admitted	340
Births in Hospital	14
Total number under treatment	371
Discharged	323
Died	31
Under treatment 30th September, 1916	17
	371

Sex.

Male	261
Female	110
	371

Revenue.

From the Province of Ontario	.....
From the Town of Parry Sound	$197 00
From other municipalities of the Province	494 00
From patients themselves for maintenance and treatment	4,864 73
From subscriptions, donations and bequests from private individuals	1,440 00
From all other sources	16 00
Total	$7,011 73

Expenditures.

Butchers' meat	$273 47
Butter and eggs	180 17
Flour, bread and meal	151 14
Milk	117 06
Tea and coffee	37 45

ST. JOSEPH'S GENERAL HOSPITAL, PARRY SOUND.—*Continued.*

Potatoes and other vegetables	78 91	Water supply	48 28
Groceries and provisions not enumerated	641 40	Salaries and wages	987 65
Drugs and medicines	279 57	Ice supply	20 00
Surgical instruments	105 75	Contingencies	169 85
Beer, wine and spirits	11 80	Repairs, ordinary	92 85
Bedding, napery and general house furnishings	495 86	Printing and postage	82 75
Brooms, brushes, mops, soap and cleaning appliances	57 41	Hay and straw	20 65
Fuel	235 85	Total	$4,144 68
Electric light, gas, oil, candles	56 81	Government grant for 1916	$1,180 58

SANATORIA FOR CONSUMPTIVES.

The following institutions, having complied with the statutory requirements, are entitled to Government aid at the rate of $3.00 per week for each patient admitted free or for whose maintenance $7.00 per week or less is contributed.

Name of Institution.	Location.	Stay of Patients.	Amount payable to each Institution for the year 1915.
			$ c.
Muskoka Free Hospital	Gravenhurst	13,710⅔ weeks	41,131 29
Toronto Free Hospital	Weston	16,004⅓ "	48,013 29
Queen Mary Hospital	Weston		
Mountain Sanatorium	Hamilton	4,978⅔ "	14,936 15
Consumptive Sanatorium	St. Catharines	382⅔ "	1,146 86
Royal Sanatorium	Ottawa	3,046⅓ "	9,139 72
Queen Alexandra Sanatorium	London	3,581⅓ "	10,743 43
Mowat Memorial Sanatorium	Kingston	1,235⅔ "	3,707 15
Essex Health Association	Windsor	943⅔ "	2,831 58
Brant Sanatorium	Brantford	690⅔ "	2,070 86
The Preventorium	Toronto	1,996⅔ "	5,990 15
Total for 1916			139,710 48
Total for 1915			123,229 30

CITY HOUSES OF REFUGE.

The usual information obtained from each Refuge, in respect of sex, and previous residence of the inmates, has been summarized as under:

Sex.

Male	2,237
Female	3,922
	6,159

Former Residence.

Received from cities and towns in which the Refuges are located	4,705
Received from counties in which the Refuges are located	410
Received from other counties in the Province	912
Immigrants and foreigners	132
	6,159

TABLE I.

Gives a summary of the operations of each Refuge during the year.

Name of Refuge.	Location.	Number of persons in the Refuges on the 1st of October, 1915.	Number admitted to Refuges during the year.	Total number under lodgment during the year ending 30th Sept., 1916.	Total number discharged during the year.	Number of deaths during the year.	Number of persons remaining in the Refuges on 30th Sept., 1916.
House of Industry	Toronto	182	112	294	138	23	133
House of Providence	"	515	272	787	309	62	416
Hospital for Incurables	"	234	95	329	34	73	222
St. John's Hospital	"	12	239	251	229	10	12
Convalescent Home	"	24	203	227	199	.....	28
The Church Home	"	23	2	25	2	1	22
The Haven	"	88	136	224	121	.....	103
Julia Greenshield's Home	"	27	10	37	5	3	29
Good Shepherd Female Refuge	"	161	46	207	71	.....	136
Aged Men's Home	"	38	25	63	10	10	43
Aged Women's Home	"	107	22	129	11	18	100
Industrial Refuge	"	84	10	94	2	.....	92
Salvation Army Rescue Home	"	66	235	301	248	5	48
Humewood House	"	17	39	56	36	2	18
Victor Home for Young Women	"	29	114	143	114	.....	29
House of Refuge	Hamilton	126	73	199	55	25	119
Home for Aged Women	"	52	8	60	2	6	52
St. Peter's Home	"	15	5	20	2	5	13
House of Industry	Kingston	39	26	65	17	13	35
House of Providence	"	180	60	240	41	38	161
Home for Friendless Women	"	27	34	61	29	10	22
House of Providence	London	143	68	211	50	16	145
Home for Aged People	"	56	70	126	12	18	96
Convalescent Home	"	3	27	30	26	.....	4
Home for Incurables	"	49	36	85	10	20	55
St. Patrick's Refuge	Ottawa	138	64	202	53	16	133
St. Charles' Hospice	"	214	83	297	51	35	211
Home for the Aged	"	28	20	48	15	6	27
Refuge Branch, Orphans' Home	"	18	9	27	6	2	19
Home for Friendless Women	"	33	130	163	128	.....	35
Refuge of Our Lady of Charity	"	174	163	337	166	3	168
Home for Incurables	"	29	31	60	7	14	39
House of Providence	Guelph	53	38	91	26	10	55
The Elliott Home	"	18	8	26	3	3	20
The Thomas Williams' Home	St. Thomas	21	6	27	3	2	22
House of Providence	Dundas	140	46	186	34	16	136
Home for the Friendless	Chatham	28	15	43	8	7	28
The Widows' Home	Brantford	15	3	18	2	3	13
Home for the Friendless	Belleville	8	4	12	4	.....	8
Home for the Friendless	Windsor	28	10	38	5	5	28
St. Paul's Home for the Aged	Cornwall	68	48	116	33	19	64
House of Providence	Peterborough	75	37	112	29	15	68
The Protestant Home	"	29	10	39	4	5	30
Algoma House of Refuge	Sault Ste. Marie	28	25	53	10	4	39
	.....	3,442	2,717	6,159	2,360	523	3,276
Totals for 1916	.....						
Totals for 1915	.....	3,328	2,878	6,206	2,278	464	3,464

TABLE II.

Shows the aggregate stay of inmates, upon which the amount of aid to be granted by the Government to each Refuge is based. The average stay per inmate is also given.

Name of Refuge.	Location.	Number of inmates during the year.	Total stay in days during the year.	Average stay per inmate in days.
House of Industry	Toronto	294	59,548	202
House of Providence	"	787	169,865	215
Hospital for Incurables	"	329	84,101	255
St. John's Hospital	"	251	6 383	25
Convalescent Home	"	227	9,736	42
The Church Home	"	25	8,327	333
The Haven	"	224	35,190	157
Julia Greenshield's Home	"	37	10,305	278
Good Shepherd Female Refuge	"	207	55,130	266
Aged Men's Home	"	63	14,832	235
Aged Women's Home	"	129	37,040	287
Industrial Refuge	"	91	33,101	352
Salvation Army Rescue Home	"	301	22,457	74
Humewood House	"	56	3,780	67
Victor Home for Young Women	"	143	6,837	47
House of Refuge	Hamilton	199	46,132	231
Home for Aged Women	"	60	18,248	304
St. Peter's Home	"	20	4,540	227
House of Industry	Kingston	65	14,983	230
House of Providence	"	240	64,246	267
Home for Friendless Women	"	61	11,362	185
House of Providence	London	211	53,341	252
Home for Aged People	"	126	37,268	295
Convalescent Home	"	30	1,396	46
Home for Incurables	"	85	19,047	223
St. Patrick's Refuge	Ottawa	202	48,191	238
St. Charles' Hospice	"	297	80,607	271
Home for the Aged	"	48	10,808	225
Refuge Branch Orphan's Home	"	27	6,952	257
Home for Friendless Women	"	163	13,058	79
Refuge of Our Lady of Charity	"	337	62,878	187
Home for Incurables	"	60	12,691	211
House of Providence	Guelph	91	18,582	204
The Elliott Home	"	26	7,504	250
The Thomas Williams' Home	St. Thomas	27	7,601	280
House of Providence	Dundas	186	52,370	280
Home for the Friendless	Chatham	43	10,020	233
The Widows' Home	Brantford	18	4,629	255
Home for the Friendless	Belleville	12	3,184	265
Home for the Friendless	Windsor	38	10,250	269
St. Paul's Home for the Aged	Cornwall	116	23,740	204
House of Providence	Peterborough	112	26,983	240
The Protestant Home	"	39	10,041	258
Algoma House of Refuge	Sault Ste. Marie	53	12,243	231
Totals for 1916		6,159	1,249,527	202
Totals for 1915		6,206	1,278,853	206

TABLE III.

Showing the cost of maintaining the Refuges.

Name of Refuge.	Location.	Aggregate stay of inmates.	Cost of dietaries	Expenditure for fuel, salaries and wages, and all general expenses.	Total expenditure exclusive of extraordinary expenses.	Average cost per inmate per day.
			$ c.	$ c.	$ c.	cents.
House of Industry	Toronto	59,548	9,963 10	7,455 28	17,418 38	29.25
House of Providence	"	169,865	35,958 68	31,183 32	67,142 00	39.52
Hospital for Incurables	"	84,101	22,336 11	45,184 86	67,520 97	80.28
St. John's Hospital	"	6,383	5,683 29	7,571 99	13,255 28	207.66
Convalescent Home	"	9,736	4,695 54	5,160 49	9,856 03	101.23
The Church Home	"	8,327	2,475 12	2,268 20	4,743 32	57.29
The Haven	"	35,190	4,883 52	10,271 11	15,154 63	43.06
Julia Greenshield's Home	"	10,305	2,936 21	3,949 07	6,885 28	66.81
Good Shepherd Female Refuge	"	55,130	9,201 91	7,066 49	16,268 40	29.51
Aged Men's Home	"	14,832	3,219 58	6,296 17	9,515 75	64.15
Aged Women's Home	"	37,040	7,786 64	12,696 61	20,483 25	55.30
Industrial Refuge	"	33,101	5,914 03	14,120 88	20,034 91	60.52
Salvation Army Rescue Home	"	22,457	1,677 62	7,121 54	8,799 16	39.18
Humewood House	"	3,780	1,308 41	4,370 88	5,679 29	150.02
Victor Home for Young Women	"	6,837	1,086 42	1,898 42	2,984 84	43.65
House of Refuge	Hamilton	46,139	7,865 92	11,453 75	19,319 67	41.88
Home for Aged Women	"	18,248	3,156 84	4,070 29	7,227 13	39.60
St. Peter's Home	"	4,540	689 15	2,245 80	2,934 95	64.86
House of Industry	Kingston	14,983	2,544 91	4,639 59	7,184 50	47.94
House of Providence	"	64,246	15,922 83	15,026 20	30,949 03	48.17
Home for Friendless Women	"	11,362	1,355 52	1,591 78	2,947 30	25.94
House of Providence	London	53,341	9,114 71	4,982 24	14,096 95	26.40
Home for Aged People	"	37,268	7,211 43	7,743 54	14,954 97	39.08
Convalescent Home	"	1,396	342 63	504 07	846 70	60.65
Home for Incurables	"	19,047	4,847 31	7,935 29	12,782 60	67.11
St. Patrick's Refuge	Ottawa	48,191	9,144 29	17,370 99	26,515 28	55.02
St. Charles' Hospice	"	80,607	13,809 44	7,126 40	20,935 84	25.97
Home for the Aged	"	10,808	1,776 35	2,822 11	4,598 46	42.54
Refuge Branch, Orphans' Home	"	6,952	3,194 43	6,238 19	9,432 62	135.68
Home for Friendless Women	"	13,058	2,082 66	15,095 53	17,178 19	131.55
Refuge of Our Lady of Charity	"	62,878	13,456 77	23,061 34	36,518 11	58.07
Home for Incurables	"	12,691	2,924 23	12,538 83	15,463 06	121,84
House of Providence	Guelph	18,582	2,825 04	3,765 74	6,590 78	35.45
The Elliott Home	"	7,504	2,141 51	4,147 76	6,289 27	83.81
The Thomas Williams Home	St. Thomas	7,601	1,272 18	3,650 02	4,922 20	64.75
House of Providence	Dundas	52,370	10,636 71	6,077 62	16,714 33	31.91
Home for the Friendless	Chatham	10,020	1,440 70	2,485 99	3,926 69	39.18
The Widows' Home	Brantford	4,629	1,488 68	2,971 11	4,459 79	96.34
Home for the Friendless	Belleville	3,184	252 35	512 65	765 00	24.02
Home for the Friendless	Windsor	10,250	1,826 51	1,389 42	3,215 93	31.37
St. Paul's Home for the Aged	Cornwall	23,740	3,377 09	2,764 11	6,141 20	25.87
House of Providence	Peterborough	26,983	3,541 75	3,751 07	7,292 82	27.03
The Protestant Home	"	10,041	1,768 79	3,592 18	5,360 97	53.39
Algoma House of Refuge	Sault Ste. Marie	12,243	1,727 92	5,714 16	7,442 08	60.78
Totals for 1916		1,249,527	250,864 83	350,883 08	601,747 91	48.16
Totals for 1915		1,278,853	231,833 39	325,005 86	556,839 25	43.54

TABLE IV.

Shows the basis upon which statutory aid is granted.

Name of Refuge.	Location.	Collective days' stay upon which computation of Refuge rate is based, exclusive of infants under one year old.	Collective days' stay upon which computation of Orphanage rate is based, exclusive of infants under one year old.	Amount received from all sources other than Government.	Computation at seven (7) cents per day.	Computation at two (2) cents per day.	Total Government allowance to each House of Refuge for the year 1916.
				$ c.	$ c.		$ c.
House of Industry	Toronto	59,548	.....	63,856 77	4,168 36	.....	4,168 36
House of Providence	"	169,865	.....	51,626 23	11,890 55	.....	11,890 55
Hospital for Incurables	"	84,101	.....	57,061 97	.....	.....	10,344 12
St. John's Hospital	"	6,383	.....	12,861 99	.....	.....	957 45
Convalescent Home	"	2,706	.....	10,463 73	189 42	.....	189 42
The Church Home	"	8,327	.....	4,575 73	582 89	.....	582 89
The Haven	"	25,177	4,157	12,395 26	1,762 29	83 14	1,845 53
Julia Greenshield's Home	"	10,305	.....	6,502 76	721 25	.....	721 25
Good Shepherd Female Refuge	"	55,130	.....	12,303 74	3,859 10	.....	3,859 10
Aged Men's Home	"	8,288	.....	8,859 57	580 16	.....	580 16
Aged Women's Home	"	23,843	.....	18,811 65	1,669 01	.....	1,669 01
Industrial Refuge	"	33,101	.....	17,853 64	2,317 07	.....	2,317 07
Salvation Army Rescue Home	"	14,395	1,159	7,554 24	1,007 65	23 18	1,030 83
Humewood House	"	3,273	440	5,559 19	229 11	8 80	237 91
Victor Home for Young Women	"	4,427	319	2,508 66	309 89	6 38	316 27
House of Refuge	Hamilton	46,132	.....	15,546 95	3,229 24	.....	3,229 24
Home for Aged Women	"	18,248	.....	5,970 25	1,277 36	.....	1,277 36
St. Peter's Home	"	4,540	.....	2,738 59	317 80	.....	317 80
House of Industry	Kingston	14,983	.....	5,265 32	1,048 81	.....	1,048 81
House of Providence	"	64,246	.....	26,414 80	4,497 22	.....	4,497 22
Home for Friendless Women	"	2,412	6,089	2,658 52	168 84	121 78	290 62
House of Providence	London	53,341	.....	10,031 00	3,733 87	.....	3,733 87
Home for Aged People	"	37,268	.....	13,472 50	2,608 76	.....	2,608 76
Convalescent Home	"	1,396	.....	606 46	97 72	.....	97 72
Home for Incurables	"	19,047	.....	12,404 42	1,333 29	.....	1,333 29
St. Patrick's Refuge	Ottawa	48,191	.....	24,490 16	3,373 37	.....	3,373 37
St. Charles' Hospice	"	80,607	.....	15,321 55	5,642 49	.....	5,642 49
Home for the Aged	"	10,808	.....	5,048 60	756 56	.....	756 56
Refuge Branch, Orphans' Home	"	8,952	.....	8,618 45	486 64	.....	486 64
Home for Friendless Women	"	9,490	673	16,356 16	664 30	13 46	677 76
Refuge of Our Lady of Charity	"	53,903	8,975	23,565 95	3,773 21	179 50	3,952 71
Home for Incurables	"	12,691	.....	14,821 81	888 37	.....	888 37
House of Providence	Guelph	18,582	.....	4,985 63	1,300 74	.....	1,300 74
The Elliott Home	"	7,504	.....	5,801 79	525 28	.....	525 28
The Thomas Williams Home	St. Thomas	7,601	.....	4,392 82	532 07	.....	532 07
House of Providence	Dundas	52,370	.....	12,827 06	3,665 90	.....	3,665 90
Home for the Friendless	Chatham	10,020	.....	3,430 38	701 40	.....	701 40
The Widows' Home	Brantford	4,629	.....	3,957 10	324 03	.....	324 03
Home for the Friendless	Belleville	3,184	.....	533 44	222 88	.....	222 88
Home for the Friendless	Windsor	10,250	.....	2,948 32	717 50	.....	717 50
St. Paul's Home for the Aged	Cornwall	23,740	.....	4,513 60	1,661 80	.....	1,661 80
House of Providence	Peterboro	26,983	.....	4,629 46	1,888 81	.....	1,888 81
The Protestant Home	"	10,041	.....	4,946 87	702 87	.....	702 87
Algoma House of Refuge	Sault Ste. Marie	12,243	.....	9,368 20	857 01	.....	857 01
Totals for 1916	.....	1,180,271	21 812	558,431 30	76,285 09	426 24	88,022 90
Totals for 1915	.....	1,210,485	14,558	601,674 41	78,685 53	291 16	89,178 89

SEPARATE REPORT

HOUSE OF INDUSTRY, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	182
Admitted	112
Total number of inmates	294
Discharged	138
Died	23
In residence, 30th September, 1916	133
	294

Places Admitted From.

City of Toronto	294
County of York and other counties	.....
Immigrants and foreigners	.....
	294

Sex.

Male	223
Female	71
	294

Receipts.

From the Province of Ontario	$5,058 13
From the City of Toronto	60,000 00
From inmates	727 00
Income from property belonging to the House	1,624 99
Subscriptions and donations	1,302 00
From City of Toronto for outdoor and casual poor	.....
Bank overdraft	.....
From other sources	202 80
Total	$68,914 92

Expenditures.

Food of all kinds	$9,963 10
Clothing, furniture and furnishings	848 47
Fuel, light and cleaning	1,978 30
Salaries and wages	2,394 57
Repairs	773 78
Outdoor and casual poor	26,317 91
Other expenditures	1,949 52
Medicine and medical comforts	213 26
Advertising and printing	57 89
Taxes and insurance	220 77
Overdraft, 1915	17,645 90
Total	$62,363 47
Government aid for 1916	$4,168 36

HOUSE OF PROVIDENCE, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	515
Admitted	272
Total number of inmates	787
Discharged	309
Died	62
In residence, 30th September, 1916	416
	787

Places Admitted From.

City of Toronto	764
County of York	10
Other counties in Ontario	13
Immigrants and foreigners	.....
	787

Sex.

Male	417
Female	370
	787

HOUSE OF PROVIDENCE, TORONTO.—*Continued.*

Receipts.

From the Province of Ontario	$12,863 13
From the City of Toronto	16,000 00
Other municipalities	.....
From inmates, in payment of board	11,676 54
Subscriptions, donations and bequests of private individuals	12,184 20
From other sources	11,765 49
Total	$64,489 36

Expenditures.

Food of all kinds	$35,958 68
Clothing, furniture and furnishings	5,650 63
Fuel, light and cleaning	7,266 40
Salaries and wages	3,417 96
Drugs and medicines	842 64
Ordinary repairs	11,707 79
Other expenditures	3,768 08
Total	$68,611 58
Government aid for 1916	$11,890 55

HOSPITAL FOR INCURABLES, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	234
Admitted	95
Total number of inmates.	329
Discharged	34
Died	73
In residence, 30th September, 1916	222
	329

Places Admitted From.

City of Toronto	288
County of York and other counties	30
Immigrants, foreigners, etc.	11
	329

Sex.

Male	166
Female	163
	329

Receipts.

From the Province of Ontario	$9,671 30
From the City of Toronto	33,767 05
From other municipalities	.....
Payments from inmates	16,710 68
Income from property belonging to the Home	2,523 68
Subscriptions, donations, etc.	4,015 42
Other sources	45 14
Total	$66,733 27

Expenditures.

Food of all kinds	$22,336 11
Clothing and furnishings	3,420 11
Fuel, light and cleaning	8,640 58
Salaries and wages	21,568 58
Repairs, ordinary	1,581 53
Medicine and medical comforts	1,693 81
Other expenses	2,947 73
Repairs and additions	5,332 52
Total	$67,520 97
Government aid for 1916	$10,344 12

ST. JOHN'S HOSPITAL, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	12
Admitted	239
Total number of inmates.	251
Discharged	229
Died	10
In residence, 30th September, 1916	12
	251

ST. JOHN'S HOSPITAL, TORONTO.—*Continued.*

Places Admitted From.

City of Toronto	187
County of York	10
Other counties	42
Immigrants, foreigners, etc.	12
	251

Sex.

Female	249
Male	2
	251

Receipts.

From the Government of Ontario	$930 90
From the City of Toronto	1,381 00
From other municipalities	184 00
From the inmates	10,428 77
Subscriptions	542 65
Income from property belonging to the House	.....
From other sources	.....
Overdraft	325 57
Total	$13,792 89

Expenditures.

Food of all kinds	$5,683 29
Furniture and furnishings	461 27
Fuel, light and cleaning	2,270 18
Salaries and wages	3,180 36
Repairs, ordinary	122 33
Medicine and medical comforts	815 65
Other expenses	972 40
Repairs, additions	287 41
Total	$13,792 89
Government aid for 1916	$957 45

THE CONVALESCENT HOME, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	24
Admitted	203
Total number of inmates.	227
Discharged	199
Died	.....
In residence, 30th September, 1916	28
	227

Places Admitted From.

City of Toronto	199
County of York	1
Other counties	18
Immigrants, foreigners, etc.	9
	227

Sex.

Male	6
Female	221
	227

Receipts.

From the Province of Ontario	$231 00
From the City of Toronto	1,316 50
Payments from inmates	9,080 11
Income from property belonging to the Home	.....
Subscriptions and donations	7 00
Received from all other sources not above enumerated	60 12
Total	$10,694 73

Expenditures.

Food of all kinds	$4,695 54
Furnishings, etc.	499 83
Fuel, light and cleaning	986 98
Salaries and wages	2,969 00
Ordinary repairs, etc.	383 07
Other expenses	293 43
Medicine and medical comforts	28 18
Total	$9,856 03
Government aid for 1916	$189 42

CHURCH HOME FOR THE AGED, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	23
Admitted	2
Total number of inmates.	25
Discharged	2
Died	1
In residence, 30th September, 1916	22
	25

Places Admitted From.

City of Toronto	21
Other counties of Ontario	3
Immigrants, etc.	1
	25

Sex.

Male	2
Female	23
	25

Receipts.

From the Government of Ontario	$574 70
From the City of Toronto	400 00
From other municipalities	.....
From payments made by inmates	3,079 00
Income from property belonging to the Home	.....
Subscriptions, donations, etc.	1,094 73
Total	$5,148 43

Expenditures.

Food of all kinds	$2,475 12
Clothing and furnishings	304 26
Fuel, light and cleaning, etc.	657 46
Salaries and wages	840 15
Repairs	87 98
Other expenses	326 35
Medicine and medical comforts	52 00
Total	$4,743 32
Government aid for 1916	$582 89

THE HAVEN, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	88
Admitted	136
Total number of inmates.	224
Discharged	121
Deaths	.....
In residence, 30th September, 1916	103
	224

Places Admitted From.

City of Toronto	184
County of York	4
Other counties	32
Immigrants, etc.	4
	224

Sex.

Male (infants)	36
Female	188
	224

Receipts.

From the Province of Ontario	$2,378 89
From the City of Toronto	2,250 00
From inmates	2,875 61
Income from laundry, etc.	5,141 53
Subscriptions and donations	1,911 30
From other sources	216 82
Total	$14,774 15

Expenditures.

Food of all kinds	$4,883 52
Clothing, furnishings, etc.	1,486 89
Fuel, light, cleaning, etc.	1,807 51
Salaries and wages	3,379 71
Repairs	998 58
Other expenses	2,402 23
Medicine and medical comforts	196 19
Total	$15,154 63
Government aid for 1916	$1,845 53

THE JULIA GREENSHIELDS HOME, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	27
Admitted	10
Total number of inmates.	37
Discharged	5
Died	3
In residence, 30th September, 1916	29
	37

Places Admitted From.

City of Toronto	37
County of York	.....
Other counties	.....
	37

Sex.

Females	37
	37

Receipts.

From the Province of Ontario	$722 96
From the City of Toronto	200 00
Payments of inmates	4,058 80
Income from property belonging to the Home	52 96
Subscriptions, donations	2,191 00
Other sources	.....
Total	$7,225 72

Expenditures.

Food of all kinds	$2,936 21
Clothing and furnishings	267 89
Fuel, light and cleaning	1,210 38
Salaries and wages	1,703 01
Repairs	627 35
Other expenses	97 24
Medicine and medical comforts	43 20
Repairs, additions	.....
Total	$6,885 28
Government aid for 1916	$721 35

GOOD SHEPHERD FEMALE REFUGE, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	161
Admitted	46
Total number of inmates.	207
Discharged	71
Died	.....
In residence, 30th September, 1916	136
	207

Places Admitted From.

City of Toronto	174
County of York and other counties	33
Immigrants and foreigners	.....
	207

Sex.

Female	207
	207

Receipts.

From the Province of Ontario	$3,964 66
From the City of Toronto	700 00
From inmates	.....
Subscriptions and donations	298 00
From other sources and laundry	11,305 74
Total	$16,268 40

Expenditures.

Food of all kinds	$9,201 91
Clothing, furniture and furnishings	2,882 52
Fuel, light and cleaning	1,320 34
Salaries and wages	425 00
Repairs	625 16
Drugs and medicines	1,330 00
Other expenditures	483 47
Total	$16,268 40
Government aid for 1916	$3,859 10

AGED MEN'S HOME, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	38
Admitted	25
Total number of inmates	63
Discharged	10
Died	10
In residence, 30th September, 1916	43
	63

Places Admitted From.

City of Toronto	56
County of York and other counties	2
Immigrants, etc.	5
	63

Sex.

Male	63
	63

Receipts.

From the Government of Ontario	$656 18
From the City of Toronto	300 00
From payments made by inmates	6,248 12
Subscriptions, donations, etc.	1,800 00
Received from all other sources	511 45
Total	$9,515 75

Expenditures.

Food of all kinds	$3,219 58
Clothing and furnishings	349 61
Fuel, light, cleaning, etc.	1,332 38
Salaries and wages	2,879 68
Repairs	395 62
Other expenses	1,485 22
Medicine and medical comforts	55 66
Total	$9,717 75
Government aid for 1916	$580 16

AGED WOMEN'S HOME, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	107
Admitted	22
Total number of inmates.	129
Discharged	11
Deaths	18
In residence, 30th September, 1916	100
	129

Places Admitted From.

City of Toronto	113
Other cities and counties	16
Immigrants, foreigners, etc.	.....
	129

Sex.

Female	129
	129

Receipts.

From the Province of Ontario	$1,671 60
From the City of Toronto	500 00
From inmates	15,316 21
Subscriptions and donations	1,088 64
From other sources	1,906 80
Total	$20,483 25

Expenditures.

Food of all kinds	$7,786 64
Clothing, furnishings, etc.	573 72
Fuel, light, cleaning, etc.	1,910 79
Salaries and wages	5,253 45
Repairs	1,032 83
Other expenses	3,821 73
Medicine and medical comforts	104 09
Total	$20,483 25
Government aid for 1916	$1,669 01

S. A. RESCUE HOME, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	66
Admitted	235
Total number of inmates.	301
Discharged	248
Deaths	5
In residence, 30th September, 1916	48
	301

Places Admitted From.

City of Toronto	244
County of York and other counties	57
Immigrants, etc.	.....
	301

Sex.

Male	35
Female	266
	301

Receipts.

From the Province of Ontario	$1,244 92
From the City of Toronto	.....
From inmates	2,733 71
Subscriptions and donations	876 17
From other sources	3,944 36
Total	$8,799 16

Expenditures.

Food of all kinds	$1,677 62
Clothing, furnishings, etc.	1,077 90
Fuel, light, cleaning, etc.	683 75
Salaries and wages	3,430 50
Repairs	62 94
Rent	1,400 00
Drugs and medicines	82 09
Other expenses	384 36
Total	$8,799 16

Government aid for 1916.... $1,030 83

HUMEWOOD HOUSE, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	17
Admitted	39
Total number of inmates.	56
Discharged	36
Deaths	2
In residence, 30th September, 1916	18
	56

Places Admitted From.

City of Toronto	54
County of York	.....
Other counties of Ontario	2
Immigrants, foreigners, etc.	.....
	56

Sex.

Male (infants)	9
Female	47
	56

Receipts.

From the Province of Ontario	$245 00
From inmates	10 00
Subscriptions, donations of private individuals	.....
From other sources	5,549 19
Total	$5,804 19

Expenditures.

Food of all kinds	$1,308 41
Clothing, furnishings, etc.	603 99
Fuel, light, cleaning, etc.	488 83
Salaries and wages	1,025 00
Repairs	1,466 42
Other expenses	786 64
Total	$5,679 29

Government aid for 1916 .... $237 91

INDUSTRIAL REFUGE, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	84
Admitted	10
Total number of inmates.	94
Discharged	2
Died	.....
In residence, 30th September, 1916	92
	94

Places Admitted From.

City of Toronto	83
County of York and other counties	1
Immigrants, foreigners, etc...	10
	94

Sex.

Female	94
	94

Receipts.

From the Province of Ontario	$2,181 27
From the City of Toronto....	1,000 00
Payments from inmates	260 00
Subscriptions, donations, etc..	1,938 67
Laundry, sewing, etc.	14,482 75
Other sources	172 22
Total	$20,034 91

Expenditures.

Food of all kinds	$5,914 03
Clothing and furnishings.....	948 82
Fuel, light and cleaning	1,995 32
Salaries and wages	5,170 12
Repairs, ordinary	356 49
Medicine and medical comforts	259 81
Other expenses	5,390 32
Total	$20,034 91
Government aid for 1916	$2,317 07

VICTOR HOME FOR YOUNG WOMEN, TORONTO.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	29
Admitted	114
Total number of inmates..	143
Discharged	114
Deaths	.....
In residence, 30th September, 1916	29
	143

Places Admitted From.

City of Toronto	121
Immigrants, foreigners, etc.....	
Other counties of Ontario.....	
County of York	22
	143

Sex.

Female	133
Male (infants)	10
	143

Receipts.

From the Province of Ontario.	$500 03
From the City of Toronto....	500 00
From inmates	106 00
Subscriptions, donations of private individuals	49 00
From other sources	1,859 66
Total	$3,014 69

Expenditures.

Food of all kinds	$1,086 42
Clothing, furnishings, etc. ...	33 25
Fuel, light, cleaning, etc.	379 39
Salaries and wages	860 00
Repairs	114 99
Other expenses	510 79
Total	$2,984 84
Government aid for 1916.....	$316 27

HOUSE OF REFUGE, HAMILTON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	126
Admitted	73
Total number of inmates.	199
Discharged	55
Died	25
In residence, 30th September, 1916	119
	199

Places Admitted From.

City of Hamilton	199
County of Wentworth	.....
	199

Sex.

Male	130
Female	69
	199

Receipts.

From the Government of Ontario	$3,772 72
From the City of Hamilton	15,010 95
From the municipalities	.....
From the inmates	536 00
Subscriptions, donations of private individuals	.....
From all other sources	.....
Total	$19,319 67

Expenditures.

Food of all kinds	$7,865 92
Clothing, furnishings, etc.	731 55
Fuel, light, cleaning, etc.	3,259 53
Salaries and wages	5,262 00
Repairs	1,275 03
Taxes and insurance	.....
Other expenses	854 35
Medicine and medical comforts	71 29
Total	$19,319 67
Government aid for 1916	$3,229 24

HOME FOR AGED WOMEN, HAMILTON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	52
Admitted	8
Total number of inmates.	60
Number discharged	2
Number of deaths	6
In residence, 30th September, 1916	52
	60

Places Admitted From.

City of Hamilton	60
	60

Sex.

Female	60
	60

Receipts.

From the Government of Ontario	$1,135 63
From the City of Hamilton	1,119 45
Income from property	.....
Subscriptions, donations of private individuals	2,043 23
From inmates	.....
From all other sources	2,807 57
Total	$7,105 88

Expenditures.

Food of all kinds	$3,156 84
Clothing, furniture, etc.	293 25
Fuel, gas, cleaning, etc.	1,053 74
Salaries and wages	2,103 60
Ordinary repairs	.....
Other expenses	534 16
Outdoor relief	.....
Medicine and medical comforts	85 54
Total	$7,227 13
Government aid for 1916	$1,277 36

ST. PETER'S HOME, HAMILTON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	15
Admitted	5
Total number of inmates.	20
Discharged	2
Died	5
In residence, 30th September, 1916	13
	20

Places Admitted From.

City of Hamilton	19
County of Wentworth and other counties	1
Immigrants, foreigners, etc.	.....
	20

Sex.

Male	20
Female	.....
	20

Receipts.

From the Ontario Government	$341 25
From the City of Hamilton	190 52
From the County of Wentworth	.....
From the inmates	1,692 50
From subscriptions, donations, etc.	170 50
From other sources	.....
Income from property belonging to House	685 07
Total	$3,079 84

Expenditures.

Food of all kinds	$689 15
Clothing, furnishings, etc.	.....
Fuel, light and cleaning	237 11
Salaries and wages	1,028 00
Ordinary repairs	36 45
Livestock and feed	18 95
Other expenses	913 29
Medicine and medical comforts	12 00
Total	$2,934 95
Government aid for 1916	$317 80

HOUSE OF INDUSTRY, KINGSTON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	39
Admitted	26
	65
Discharged	17
Died	13
In residence, 30th September 1916	35
	65

Places Admitted From.

City of Kingston	18
County of Frontenac	26
Other counties of Ontario	21
Immigrants, foreigners, etc.	.....
	65

Sex.

Male	42
Female	23
	65

Receipts.

From the Province of Ontario	$922 46
From the City of Kingston	1,000 00
County of Frontenac	1,602 01
Lennox and Addington	1,857 27
Payments from inmates	215 80
Income from property	301 19
Subscriptions and donations	120 00
Other sources	169 05
Total	$6,187 78

Expenditures.

Food of all kinds	$2,544 91
Clothing, furniture and furnishings	625 05
Fuel, light and cleaning	722 83
Salaries and wages	937 60
Repairs, ordinary	361 04
Farming	179 28
Other expenses	1,565 51
Medicine and medical comforts	32 28
Repairs, additions	216 00
Total	$7,184 50
Government aid for 1916	$1,048 81

HOUSE OF PROVIDENCE, KINGSTON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	180
Admitted	60
Total number of inmates	240
Discharged	41
Died	38
In residence, 30th September, 1916	161
	240

Places Admitted From.

City of Kingston	63
County of Frontenac	22
Other counties	143
Immigrants, foreigners, etc.	12
	240

Sex.

Male	131
Female	109
	240

Receipts.

From the Province of Ontario	$4,556 65
From the City of Kingston	100 00
From the County of Frontenac	1,028 07
From other municipalities	1,348 14
Income from property	495 74
Payment from inmates	8,014 38
Subscriptions and donations	5,497 67
Interest earnings, etc.	6,571 87
Other sources	3,359 02
Total	$30,971 54

Expenditures.

Food of all kinds	$15,922 83
Clothing, furnishing, etc.	3,392 99
Salaries and wages	6 75
Fuel, light and cleaning	4,839 52
Repairs, ordinary	985 60
Taxes and insurance	1,775 35
Other expenses	3,816 90
Medicine and medical comforts	209 09
Repairs, additions	.....
Total	$30,949 03
Government aid for 1916	$4,497 22

HOME FOR FRIENDLESS WOMEN AND INFANTS, KINGSTON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	27
Admitted	34
Total number of inmates	61
Discharged	29
Died	10
In residence, 30th September, 1916	22
	61

Places Admitted From.

City of Kingston	25
County of Frontenac	14
Other counties in Ontario	22
Immigrants, foreigners, etc.	.....
	61

Sex.

Male	27
Female	34
	61

Receipts.

From the Province of Ontario	$304 12
From the City of Kingston	500 00
From the County of Frontenac	175 00
From inmates	1,678 62
Subscriptions and donations	294 50
Other sources	10 40
Total	$2,962 64

Expenditures.

Food of all kinds	$1,355 52
Clothing and furnishings	172 00
Fuel, light and cleaning, etc.	299 00
Salaries and wages	540 00
Repairs	149 53
Additions	.....
Other expenses	431 25
Total	$2,947 30
Government aid for 1916	$290 62

HOUSE OF PROVIDENCE, LONDON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	143
Admitted	68
Total number of inmates.	211
Discharged	50
Died	16
In residence, 30th September, 1916	145
	211

Places Admitted From.

City of London	148
County of Middlesex	11
Other counties in Ontario	52
Immigrants, foreigners, etc.	.....
	211

Sex.

Male	91
Female	120
	211

Receipts.

From the Province of Ontario	$4,094 23
From the City of London	700 00
From other municipalities	493 00
Payment from inmates	5,307 00
Subscriptions and donations	3,531 00
Other sources	.....
Total	$14,125 23

Expenditures.

Food of all kinds	$9,114 71
Clothing, furniture and furnishings	672 34
Fuel, light and cleaning	2,189 17
Salaries and wages	696 25
Repairs, ordinary	447 71
Taxes, insurance, etc.	287 98
Other expenses	605 31
Medicine and medical comforts	83 48
Total	$14,096 95
Government aid for 1916	$3,733 87

HOME FOR AGED PEOPLE, LONDON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	56
Admitted	70
Total number of inmates.	126
Discharged	12
Died	18
In residence, 30th September, 1916	96
	126

Places Admitted From.

City of London	83
Other counties of Ontario	16
County of Middlesex	27
Immigrants, foreigners, etc.	.....
	126

Sex.

Male	63
Female	63
	126

Receipts.

From the Province of Ontario	$2,265 34
From the City of London	3,676 30
From the County of Middlesex	.....
From other municipalities	.....
Payment from inmates	8,748 80
Subscriptions and donations	251 00
Other sources	796 40
Total	$15,737 84

Expenditures.

Food of all kinds	$7,211 43
Clothing, furniture and furnishings	1,344 37
Fuel, light and cleaning	1,420 91
Salaries and wages	3,081 45
Repairs, ordinary	1,107 85
Drugs and medicines	216 80
Other expenses	572 16
Total	$14,954 97
Government aid for 1916	$2,608 76

CONVALESCENT HOME, LONDON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	3
Admitted	27
Total number of inmates.	30
Discharged	26
Died	.....
In residence, 30th September, 1916	4
	30

Places Admitted From.

City of London	30
County of Middlesex and other counties	.....
	30

Sex.

Male	11
Female	19
	30

Receipts.

From the Province of Ontario	$107 59
From the City of London	.....
Payment from inmates	191 85
Subscriptions and donations	390 00
Other sources	24 64
Total	$714 08

Expenditures.

Food of all kinds	$342 63
Clothing, furniture and furnishings	.....
Fuel, light and cleaning	191 17
Salaries and wages	204 00
Repairs, ordinary	44 49
Other expenses	64 41
Total	$846 70
Government aid for 1916	$97 72

HOME FOR INCURABLES, LONDON.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	49
Admitted	36
Total number of inmates.	85
Discharged	10
Died	20
In residence, 30th September, 1916	55
	85

Places Admitted From.

City of London	38
County of Middlesex	3
Other counties in Ontario	44
	85

Sex.

Male	35
Female	50
	85

Receipts.

From the Province of Ontario	$1,110 27
From the City of London	1,103 40
From the County of Middlesex	.....
Payments from inmates	10,697 15
Subscriptions, donations, etc.	246 50
Other sources	357 37
Total	$13,514 69

Expenditures.

Food of all kinds	$4,847 31
Clothing and furnishings	1,199 41
Fuel, light and cleaning	1,258 57
Salaries and wages	4,593 03
Repairs	475 60
Other expenses	173 02
Medicine and medical comforts	235 66
Total	$12,782 60
Government aid for 1916	$1,333 29

ST. PATRICK'S REFUGE, OTTAWA.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	138
Admitted	64
Total number of inmates..	202
Discharged	53
Died	16
In residence, 30th September, 1916	133
	202

Places Admitted From.

City of Ottawa	108
County of Carleton	38
Other counties in Ontario	56
Immigrants	.....
	202

Sex.

Male	77
Female	125
	202

Receipts.

From the Government of Ontario	$4,126 68
From the City of Ottawa	1,850 00
From the County of Carleton.	50 00
From other municipalities	.....
From payments made by inmates	4,164 25
Subscriptions, donations, etc..	12,097 11
Other sources	6,328 80
Total	$28,616 84

Expenditures.

Food of all kinds	$9,144 29
Clothing and furnishings	1,015 33
Fuel, light, cleaning, etc.	3,047 65
Salaries and wages	2,164 75
Repairs, ordinary	2,638 84
Additions	4,552 39
Live stock and farm grounds.	1,301 26
Taxes and insurance	238 35
Medicine and medical comforts	205 90
Other expenses	2,206 52
Total	$26,515 28
Government aid for 1916	$3,373 37

ST. CHARLES' HOSPICE, OTTAWA.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	214
Admitted	83
Total number of inmates..	297
Discharged	51
Died	35
In residence, 30th September, 1916	211
	297

Places Admitted From.

City of Ottawa	229
County of Carleton	6
Other counties	60
Immigrants, foreigners, etc.	2
	297

Sex.

Male	124
Female	173
	297

Receipts.

From the Government of Ontario	$5,222 21
From the City of Ottawa	2,800 00
From the County of Carleton.	50 00
From other municipalities	2,185 65
Income from property belonging to the House	565 00
From payments made by inmates	5,672 45
Subscriptions, donations, etc..	3,523 10
Other sources	525 35
Total	$20,543 76

Expenditures.

Food of all kinds	$13,809 44
Clothing and furnishings	947 28
Fuel, light, cleaning, etc.	2,821 66
Salaries and wages	600 00
Repairs	1,542 91
Taxes and insurance	362 00
Other expenses	602 43
Medicine and medical comforts	250 12
Total	$20,935 84
Government aid for 1916	$5,642 49

HOME FOR THE AGED, OTTAWA.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, October 1st, 1915	28
Admitted	20
Total number of inmates	48
Discharged	15
Died	6
In residence, 30th September, 1916	27
	48

Places Admitted From.

City of Ottawa	41
County of Carleton	5
Other Counties	2
Immigrants, foreigners	.....
	48

Sex.

Male	47
Female	1
	48

Receipts.

From the Government of Ontario	$838 38
From the City of Ottawa	1,000 00
From the County of Carleton.	300 00
From other municipalities	.....
From payments made by inmates	287 63
Subscriptions, donations, etc.	3,460 97
Income from property	.....
Other sources	.....
Total	$5,886 98

Expenditures.

Food of all kinds	$1,776 35
Clothing and furnishings	.....
Fuel, light, cleaning, etc.	550 50
Salaries and wages, etc.	1,450 00
Repairs	143 25
Taxes and insurance	.....
Other expenses	609 86
Medicine and medical comforts	68 50
Total	$4,598 46
Government aid for 1916	$756 56

REFUGE BRANCH, ORPHANS' HOME, OTTAWA.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	18
Admitted	9
Total number of inmates.	27
Discharged	6
Died	2
In residence, 30th September, 1916	19
	27

Places Admitted From.

City of Ottawa	22
County of Carleton	2
Other counties in Ontario	3
Immigrants, etc.	.....
	27

Sex.

Female	27
	27

Receipts.

From the Province of Ontario	$818 81
From the City of Ottawa	1,500 00
From the County of Carleton.	300 00
Payment from inmates	1,255 63
Income from property	1,024 25
Subscriptions and donations, etc.	4,538 57
Total	$9,437 26

Expenditures.

Food of all kinds	$3,194 43
Clothing, furniture and furnishings	1,152 37
Fuel, light and cleaning	1,048 13
Salaries and wages	2,379 17
Taxes and insurance	.....
Repairs, ordinary	80 95
Medicine, medical comforts	51 57
Other expenses	1,134 88
Repairs, additions	391 12
Total	$9,432 62
Government aid for 1916	$486 64

THE HOME FOR FRIENDLESS WOMEN, OTTAWA.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	33
Admitted	130
Total number of inmates.	163
Discharged	128
Died	.....
In residence, 30th September, 1916	35
	163

Places Admitted From.

City of Ottawa	102
County of Carleton	7
Other counties in Ontario	41
Immigrants, etc.	13
	163

Sex.

Male	26
Female	137
	163

Receipts.

From the Province of Ontario	$804 16
From the City of Ottawa	500 00
From the County of Carleton.	50 00
Payment from inmates	51 25
Subscriptions and donations..	95 40
From all other sources	15,659 50
Total	$17,160 31

Expenditures.

Food of all kinds	$2,082 66
Clothing, furniture and furnishings	537 66
Fuel, light and cleaning	1,757 89
Salaries and wages	6,504 22
Repairs, ordinary	390 56
Taxes and insurance	305 01
Medicine and medical comforts	320 39
Repairs, additions	.....
Other expenses	5,279 80
Total	$17,178 19
Government aid for 1916	$677 76

THE REFUGE OF OUR LADY OF CHARITY, OTTAWA.

The following summaries show the operations of this Refuge during the year:

Movements of Inmates.

In residence, 1st October, 1915	174
Admitted	163
Total number of inmates.	337
Discharged	166
Died	3
In residence, 30th September, 1916	168
	337

Places Admitted From.

City of Ottawa	253
County of Carleton	45
Other counties in Ontario	39
Immigrants, foreigners, etc.	.....
	337

Sex.

Female	337
	337

Receipts.

From the Government of Ontario	$4,094 88
From the City of Ottawa	425 00
County of Carleton	50 00
From payments made by inmates	2,700 35
Subscriptions, donations, etc..	725 00
Other sources	19,630 50
Income from Home property..	35 00
Total	$27,660 73

Expenditures.

Food of all kinds	$13,456 77
Clothing and furnishings	4,232 00
Fuel, light, cleaning, etc.	7,698 87
Salaries and wages	800 20
Repairs	1,033 60
Live stock and farm grounds.	1,960 57
Taxes and insurance	1,567 25
Medicine and medical comforts	704 48
Repairs, additions	2,704 48
Other expenses	2,359 89
Total	$36,518 11
Government aid for 1916	$3,952 71

HOME FOR INCURABLES, OTTAWA.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	29
Admitted	31
Total number of inmates	60
Discharged	7
Died	14
In residence, 30th September, 1916	39
	60

Places Admitted From.

City of Ottawa	56
County of Carleton	1
Other counties in Ontario	2
Immigrants, foreigners, etc.	1
	60

Sex.

Male	21
Female	39
	60

Receipts.

From the Government of Ontario	$621 25
From the County of Carleton.	.....
From the City of Ottawa	2,000 00
From payments made by inmates	2,352 00
Subscriptions, donations, etc.	1,158 26
Other sources	500 81
Income from Home property	2,743 50
Bank overdraft	6,087 24
Total	$15,463 06

Expenditures.

Food of all kinds	$2,924 23
Clothing, furniture and furnishings	1,027 23
Fuel, light and cleaning	863 04
Salaries and wages	3,605 79
Repairs, ordinary	88 51
Taxes and insurance	117 98
Other expenses	6,648 80
Medicine and medical comforts	187 48
Total	$15,463 06
Government aid for 1916	$888 37

HOUSE OF PROVIDENCE, GUELPH.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	53
Admitted	38
Total number of inmates	91
Discharged	26
Died	10
In residence, 30th September, 1916	55
	91

Places Admitted From.

From the City of Guelph	43
From the County of Wellington	35
Other counties in Ontario	13
Foreigners, etc.	.....
	91

Sex.

Male	57
Female	34
	91

Receipts.

From the Province of Ontario	$1,348 69
From the City of Guelph	2,680 00
From inmates	465 50
From the County of Wellington	200 00
Subscriptions, donations and bequests	500 00
From other sources	1,140 13
Total	$6,334 32

Expenditures.

Food of all kinds	$2,825 04
Clothing and furnishings	535 69
Fuel, light and cleaning	898 35
Salaries and wages	696 00
Ordinary repairs	334 64
Live stock and farm grounds.	647 17
Other expenses	553 80
Medicine and medical comforts	100 09
Total	$6,590 78
Government aid for 1916	1,300 74

THE ELLIOTT HOME, GUELPH.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	18
Admitted	8
Total number of inmates.	26
Discharged	3
Died	3
In residence, 30th September, 1916	20
	26

Places Admitted From.

City of Guelph	9
County of Wellington	10
Other counties in Ontario	7
Immigrants, foreigners, etc.	.....
	26

Sex.

Male	11
Female	15
	26

Receipts.

From the Province of Ontario	$487 48
From the City of Guelph	.....
From the County of Wellington	.....
Payments from inmates	4,838 68
Subscriptions and donations	.....
From other sources	651 70
Bank overdraft	311 41
Total	$6,289 27

Expenditures.

Food of all kinds	$2,141 51
Clothing, furniture and furnishings	182 86
Fuel, gas, etc.	633 61
Salaries and wages	1,756 82
Repairs, ordinary	112 46
Other expenses	1,255 82
Medicine and medical comforts	5 34
Repairs, additions	200 85
Total	$6,289 27
Government aid for 1916	$525 28

THE THOMAS WILLIAMS HOME, ST. THOMAS.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	21
Admitted	6
Total number of inmates.	27
Discharged	3
Died	2
In residence, 30th September, 1916	22
	27

Places Admitted From.

City of St. Thomas	27
	27

Sex.

Male	12
Female	15
	27

Receipts.

From the Province of Ontario	$524 37
From the City of St. Thomas.	.....
From payments by inmates	.....
Subscriptions, etc.	1,816 00
Income from property	2,474 37
From other sources	102 45
Total	$4,917 19

Expenditures.

Food of all kinds	$1,272 18
Clothing and furnishings	148 35
Fuel, light, cleaning, etc.	425 87
Salaries and wages	918 00
Repairs, ordinary	50 10
Other expenses	197 16
Medicine and medical comforts	85 01
Repairs, additions	1,825 53
Total	$4,922 20
Government aid for 1916	$532 07

HOUSE OF PROVIDENCE, DUNDAS.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Patients.

In residence, 1st October, 1915	140
Admitted	46
Total number of inmates.	186
Discharged	34
Died	16
In residence, 30th September, 1916	136
	186

Places Admitted From.

City of Hamilton	75
County of Wentworth	30
Other counties in Ontario	54
Immigrants, foreigners, etc	27
	186

Sex.

Male	88
Female	98
	186

Receipts.

From the Province of Ontario	$3,771 53
From the Town of Dundas	.....
From the County of Wentworth	.....
From other municipalities	1,411 61
From inmates	7,190 32
Income from property	157 50
Subscriptions and donations of private individuals	2,438 32
Other sources	1,629 31
Total	$16,598 59

Expenditures.

Food of all kinds	$10,636 71
Clothing, furniture and furnishings	1,137 41
Fuel, light and cleaning	2,277 65
Salaries	751 87
Repairs, ordinary	.....
Other expenditures	636 39
Medicine and medical comforts	374 30
Taxes and insurance	900 00
Total	$16,714 33
Government aid for 1916	$3,665 90

THE HOME FOR THE FRIENDLESS, CHATHAM.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	28
Admitted	15
Total number of inmates.	43
Discharged	8
Died	7
In residence, 30th September, 1916	28
	43

Places Admitted From.

City of Chatham	43
County of Kent	.....
Other counties in Ontario	.....
Immigrants, foreigners, etc.	.....
	43

Sex.

Male	29
Female	14
	43

Receipts.

From the Province of Ontario	$659 68
From the City of Chatham	2,680 00
From inmates themselves	592 10
Subscriptions and donations of private individuals	111 09
Other sources	47 19
Total	$4,090 06

Expenditures.

Food of all kinds	$1,440 70
Clothing and furnishings	110 50
Fuel, light, cleaning, etc.	289 76
Salaries and wages	834 75
Repairs	69 88
Other expenses	1,181 10
Total	$3,926 69
Government aid for 1916	$701 40

THE WIDOWS' HOME, BRANTFORD.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	15
Admitted	3
Total number of inmates.	18
Discharged	2
Died	3
In residence, 30th September, 1916	13
	18

Places Admitted From.

City of Brantford	17
County of Brant	1
Other counties in Ontario	.....
	18

Sex.

Female	18
	18

Receipts.

From the Province of Ontario	$395 71
From inmates	234 00
Subscriptions and donations	3,541 94
From other sources	181 16
Total	$4,352 81

Expenditures.

Food of all kinds	$1,488 68
Clothing and furnishings	126 51
Fuel, light, cleaning, etc.	254 89
Salaries and wages	482 00
Repairs, ordinary, etc.	113 11
Other expenses	1,994 60
Total	$4,459 79
Government aid for 1916	$324 03

THE HOME FOR THE FRIENDLESS, BELLEVILLE.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	8
Admitted	4
Total number of inmates.	12
Discharged	4
Died	.....
In residence, 30th September, 1916	8
	12

Places Admitted From.

City of Belleville	12
	12

Sex.

Male	5
Female	7
	12

Receipts.

From the Province of Ontario	$231 76
From the City of Belleville	300 00
From inmates	.....
Subscriptions and donations	121 80
From other sources	111 64
Total	$765 00

Expenditures.

Food of all kinds	$252 35
Clothing and furnishings	9 00
Fuel, light and cleaning	127 01
Salaries and wages	262 62
Repairs, ordinary	64 22
Other expenses	49 80
Total	$765 00
Government aid for 1916	$222 88

THE HOUSE OF PROVIDENCE, PETERBOROUGH.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	75
Admitted	37
Total number of inmates	112
Discharged	29
Died	15
In residence, 30th September, 1916	68
	112

Places Admitted From.

City of Peterborough	62
County of Peterborough	12
From other counties	38
Immigrants, foreigners, etc.	.....
	112

Sex.

Male	45
Female	67
	112

Receipts.

From the Province of Ontario	$2,014 11
From the City and County of Peterborough	401 68
From municipalities for board of inmates	.....
From inmates	2,660 25
Subscriptions and donations	1,276 13
Other sources	291 40
Total	$6,643 57

Expenditures.

Food of all kinds	$3,541 75
Clothing and furnishings	932 50
Fuel, light and cleaning	1,232 44
Repairs, ordinary	256 40
Other expenses	573 88
Medicine and medical comforts	121 60
Salaries and wages	634 25
Total	$7,292 82
Government aid for 1916	$1,888 81

HOME FOR THE FRIENDLESS, WINDSOR.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	28
Admitted	10
Total number of inmates.	34
Discharged	5
Died	5
In residence, 30th September, 1916	28
	38

Places Admitted From.

City of Windsor	10
County of Essex	28
Immigrants, foreigners, etc.	.....
	38

Sex.

Male	27
Female	11
	38

Receipts.

From the Province of Ontario	$698 67
From the City of Windsor	2,750 00
From inmates	106 37
Subscriptions and donations	65 05
Other sources	26 90
Total	$3,646 99

Expenditures.

Food of all kinds	$1,826 51
Clothing and furnishings	38 80
Fuel, light and cleaning	239 41
Repairs, ordinary	23 22
Salaries and wages	759 20
Other expenses	328 79
Total	$3,215 93
Government aid for 1916	$717 50

ST. PAUL'S HOME FOR THE AGED, CORNWALL.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	68
Admitted	48
Total number of inmates	116
Discharged	33
Died	19
In residence, 30th September, 1916	64
	116

Places Admitted From.

Town of Cornwall	37
County of Stormont	11
Other counties	68
Immigrants	.....
	116

Sex.

Male	67
Female	49
	116

Receipts.

From the Province of Ontario	$1,653 34
From the Town of Cornwall	.....
From other municipalities	150 00
From inmates themselves	1,090 12
Subscriptions, donations and bequests of private individuals	1,800 00
From other sources	1,473 48
Total	$6,166 94

Expenditures.

Food of all kinds	$3,377 09
Clothing and furnishings	184 34
Fuel, light, cleaning, etc.	1,620 52
Repairs, ordinary	96 52
Medicine and medical comforts	92 00
Other expenses	770 73
Total	$6,141 20
Government aid for 1916	$1,661 80

THE PETERBOROUGH PROTESTANT HOME.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	29
Admitted	10
Total number of inmates	39
Discharged	4
Died	5
In residence, 30th September, 1916	30
	39

Places Admitted From.

City of Peterborough	35
County of Peterborough	4
	39

Sex.

Male	23
Female	16
	39

Receipts.

From the Province of Ontario	$761 46
From the City of Peterborough	1,603 65
From inmates themselves	1,703 25
Income from property belonging to the Home	66 65
Subscriptions, donations from private individuals	45 00
From all sources not above mentioned	1,528 32
Total	$5,708 33

Expenditures.

Food of all kinds	$1,768 79
Clothing and furnishings	303 44
Fuel, light and cleaning	765 67
Repairs, ordinary	200 18
Salaries and wages	1,763 17
Other expenses	498 22
Medicine and medical comforts	61 50
Total	$5,360 97
Government grant for 1916	$702 87

HOUSE OF REFUGE, DISTRICT OF ALGOMA.

Full particulars of the operations of this Institution will be found in the annexed summaries:

Movements of Inmates.

In residence, 1st October, 1915	28
Admitted	25
Total number of inmates	53
Discharged	10
Died	4
In residence, 30th September, 1916	39
	53

Places Admitted From.

Town of Sault Ste. Marie	22
District of Algoma	25
Other counties	1
Immigrants	5
	53

Sex.

Male	43
Female	10
	53

Receipts.

From the Province of Ontario	$465 85
From other municipalities	8,733 59
From inmates themselves	75 00
Subscriptions, donations and bequests of private individuals	160 00
From other sources	369 61
Total	$9,804 05

Expenditures.

Food of all kinds	$1,727 92
Light, fuel, cleaning, etc.	862 70
Repairs, ordinary	256 47
Medicine and medical comforts	68 23
Other expenses	2,367 35
Salaries and wages	2,159 41
Total	$7,442 08
Government aid for 1916	$857 01

ORPHAN ASYLUMS

The statistical tables on the following pages of this report show an increase in the contributions to several of the Institutions, while in some cases there is a falling off as compared with last year.

The total number of children cared for in the Orphanages during the year was 4,428, as compared with 4,850 in 1915.

In the tables will be found full details of the receiving and discharging of children, etc.

The statistics relating to the sex and previous residence of the inmates are given in the following summary:

Sex.

Male	2,178
Female	2,250
	4,428

Previous Residence.

Received from cities in which Orphanages are located	3,132
Received from counties in which Orphanages are located	377
Received from other counties in the Province	683
Immigrants and foreigners and unknown	236
	4,428

TABLE I.—Schedule "C"—Orphanages

Name of Orphanage.	Location.	No. in residence 1st of October, 1915.	No. admitted during the year ending 30th Sept., 1916.	Total number maintained during the year.	No. discharged during the year.	No. of deaths during the year.	No. remaining in residence on 30th Sept., 1916.
Roman Catholic Orphans' Asylum	Toronto	237	196	433	225	.....	208
Protestant Orphans' Home	"	162	75	237	94	.....	143
Girls' Home	"	83	59	142	71	2	69
Boys' Home	"	73	61	134	45	.....	89
The Working Boys' Home	"	22	52	74	60	.....	14
Infants' Home	"	139	148	287	176	32	79
Home for Incurable Children	"	30	5	35	5	1	29
St Vincent's Infants' Home	"	94	20	114	75	8	31
St. Mary's Orphan Asylum	Hamilton	114	70	184	88	.....	96
Protestant Orphan Asylum	"	.....	.....	.....	.....	.....	.....
Boys' Home	"	74	24	98	32	.....	66
Girls' Home	"	45	37	82	31	.....	51
Home for the Friendless	"	66	180	246	180	10	56
Salvation Army Rescue Home	"	35	41	76	43	3	30
Orphans' Home	Kingston	73	62	135	75	.....	60
St. Mary's of the Lake Orphanage	"	99	49	148	43	4	101
Orphans' Home	Ottawa	46	103	149	100	.....	49
St. Patrick's Orphan Asylum	"	87	86	173	70	.....	103
St. Joseph's Orphan Asylum	"	250	100	350	140	1	209
Rescue Home and Children's Shelter	"	61	130	191	123	9	59
Boys' Home	"	12	36	48	43	.....	5
Roman Catholic Orphans' Home	London	111	120	231	77	20	134
Protestant Orphans' Home	"	36	60	96	42	.....	54
Women's Refuge and Infants' Home	"	13	21	34	25	2	7
Salvation Army Rescue Home and Children's Shelter	"	23	64	87	64	1	22
Protestant Home, Orphanage Branch	St. Catharines	22	60	82	49	.....	33
St. Agatha Orphan Asylum	St. Agatha	59	19	78	26	.....	52
Orphans' Home	Fort William	75	79	154	67	.....	87
Kitchener Orphanage	Kitchener	31	83	114	82	.....	32
Nazareth Orphanage	Cornwall	17	43	60	26	1	33
St. Vincent's Orphanage	Peterboro'	38	29	67	26	.....	41
Loyal True Blue Orphanage	Picton	60	29	89	19	3	67
Totals for 1916		2,287	2,141	4,428	2,222	97	2,109
Totals for 1915		2,408	2,442	4,850	2,376	164	2,310

TABLE II.—Schedule C.—Orphanages.

Name of Orphanage.	Location.	Aggregate stay of inmates.	Total expenditure on maintenance account for the year ending 30th September, 1916.	Average cost per inmate per day.
			$ c.	
Roman Catholic Orphans' Asylum	Toronto	75,300	21,329 36	28.32
Protestant Orphans' Home	"	57,546	23,720 17	41.22
Girls' Home	"	24,356	10,835 86	44.48
Boys' Home	"	30,654	16,381 39	53.43
The Working Boys' Home	"	7,460	6,038 01	80.93
Infants' Home	"	40,336	11,533 59	28.59
Home for Incurable Children	"	10,774	14,307 41	132.70
St. Vincent's Infants' Home	"	20,770	4,175 29	20.10
St. Mary's Orphan Asylum	Hamilton	40,898	10,048 73	24.56
Protestant Orphan Asylum	"			
Boys' Home	"	24,270	9,389 11	38.69
Girls' Home	"	14,807	4,872 76	32.90
Home for the Friendless	"	23,036	6,667 82	28.95
Salvation Army Rescue Home	"	13,966	7,757 05	55.54
Orphans' Home	Kingston	23,073	7,588 45	32.88
St. Mary's of the Lake Orphanage	"	37,914	8,765 35	23.11
Orphans' Home	Ottawa	20,074	*	
St. Patrick's Orphan Asylum	"	35,441	*	
St. Joseph's Orphan Asylum	"	82,626	17,751 39	21.48
Rescue Home and Children's Shelter	"	25,986	9,871 08	37.99
Boys' Home	"	2,881	2,600 53	90.26
Roman Catholic Orphans' Home	London	45,332	10,970 67	24.20
Protestant Orphans' Home	"	19,875	5,339 31	26.86
Women's Refuge and Infants' Home	"	4,601	2,623 93	57.03
Salvation Army Rescue Home and Children's Shelter	"	9,075	4,231 54	46.06
Protestant Home, Orphanage Branch	St. Catharines	9,140	4,765 39	52.13
St. Agatha Orphans' Asylum	St. Agatha	19,748	3,749 68	18.98
Orphans' Home	Fort William	34,008	8,336 76	24.51
Kitchener Orphanage	Kitchener	11,820	2,830 92	23.95
Nazareth Orphanage	Cornwall	8,164	*	
St. Vincent's Orphanage	Peterborough	12,271	2,764 84	22.53
Loyal True Blue Orphanage	Picton	22,783	9,075 17	39.83
Totals for 1916		808,985	248,321 56	30.67
Totals for 1915		868,919	220,161 47	25.33

* Included in Refuge Branch.

TABLE III.—Schedule C—Orphanages.

Name of Orphanage.	Location.	Collective days' stay upon which computation of Orphanage rate is based.	Collective days' stay upon which computation of Refuge rate is based.	Amount received from all sources other than Government	Computation at two (2) cents per day.	Computation at seven (7) cents per day, being Refuge rate for adults.	Total Government grant for the year 1916.
				$ c.	$ c.	$ c.	$ c.
Roman Catholic Orphans' Asylum	Toronto	82,543	.....	19,450 81	1,650 86	.....	1,650 86
Protestant Orphans' Home	"	57,546	.....	13,949 28	1,150 92	.....	1,150 92
Girls' Home	"	24,356	.....	10,066 00	487 12	.....	487 12
Boys' Home	"	30,684	.....	14,350 51	613 68	.....	613 68
The Working Boys' Home	"	7,460	.....	5,915 42	149 20	.....	149 20
Infants' Home	"	28,760	11,576	10,195 74	575 20	810 32	1,385 52
Home for Incurable Children	"	10,774	.....	13,997 38	215 48	.....	215 48
St. Vincent Infant Home	"	17,411	3,359	2,476 91	348 22	235 13	583 35
St. Mary's Orphan Asylum	Hamilton	40,898	.....	9,330 07	817 96	.....	817 96
Protestant Orphan Asylum	"	.....	.....	.....	.....	.....	.....
Boys' Home	"	24,270	.....	8,907 97	485 40	.....	485 40
Girls' Home	"	14,807	.....	4,643 03	296 14	.....	296 14
Home for the Friendless	"	17,953	5,083	6,186 59	359 06	355 81	714 87
Salvation Army Rescue Home	"	7,890	6,076	7,189 22	157 80	425 32	583 12
Orphans' Home	Kingston	23,073	.....	6,922 50	461 46	.....	461 46
St. Mary's of the Lake Orphanage	"	37,914	.....	7,361 42	758 28	.....	758 28
Orphans' Home	Ottawa	20,074	.....	.....	401 48	.....	401 48
St. Patrick's Orphan Asylum	"	*35,441	.....	.....	708 82	.....	708 82
St. Joseph's Orphan Asylum	"	82,626	.....	16,001 78	1,652 52	.....	1,652 52
Rescue Home and Children's Shelter	"	19,665	6,321	9,374 80	393 30	442 47	835 77
Boys' Home	"	2,881	.....	2,480 18	57 62	.....	57 62
Roman Catholic Orphans' Home	London	45,332	.....	10,099 14	906 64	.....	906 64
Protestant Orphans' Home	"	19,875	.....	5,196 07	397 50	.....	397 50
Women's Refuge and Infants' Home	"	3,665	936	2,201 43	73 30	65 52	138 82
S. A. Rescue Home and Children's Shelter	"	3,658	5,417	3,856 08	73 16	379 19	452 35
Protestant Home, Orphanage Branch	St. Catharines	9,140	.....	4,714 30	182 80	.....	182 80
St. Agatha Orphan Asylum	St. Agatha	19,748	.....	3,317 97	394 96	.....	394 96
Orphans' Home	Fort William	34,008	.....	7,369 05	680 16	.....	680 16
Kitchener Orphanage	Kitchener	11,820	.....	2,582 35	236 40	.....	236 40
Nazareth Orphanage	Cornwall	* 8,164	.....	.....	163 28	.....	163 28
St. Vincent's Orphanage	Peterboro'	12,271	.....	2,205 05	245 42	.....	245 42
Loyal True Blue Orphanage	Picton	22,783	.....	11,179 60	455 66	.....	455 66
Totals for 1916	.....	777,490	38,768	221,511 65	15,549 80	2,713 76	18,263 56
Totals for 1915	.....	814,018	54,901	199,490 73	16,280 36	3,843 07	20,123 43

*Included in the Refuge Branch.

SEPARATE REPORTS

ROMAN CATHOLIC ORPHAN ASYLUM, TORONTO.

The following summaries show the operations of this Orphanage during the year:

Movements of Inmates.

In residence, 1st October, 1915..	237
Admitted	196
Total number of inmates ..	433
Discharged	225
Died	....
In residence, 30th September, 1916	208
	433

Sex.

Male	207
Female	226
	433

Places Admitted From.

City of Toronto	403
County of York	....
Other parts of Ontario	30
Immigrants, foreigners, etc.	....
	433

The receipts of the Institution during the year, including the Government grant of $1,705.78, were $21,156.59, and the expenditures were $21,329.36.

Government aid for the year 1916, $1,650.86.

PROTESTANT ORPHANS' HOME, TORONTO.

The following summaries show the operations of this Institution during the past year:—

Movements of Inmates.

In residence, 1st October, 1915..	162
Admitted	75
Total number of inmates ..	237
Discharged	94
Died	....
In residence, 30th September, 1916	143
	237

Sex.

Male	137
Female	100
	237

Places Admitted From.

City of Toronto	115
Immigrants, foreigners, etc.	71
Other parts of Ontario	51
	237

The receipts of the Institution during the year, including the Government grant of $1,157.82, were $15,107.10, and the expenditures were $23,720.17.

Government aid for the year 1916, $1,150.92.

GIRLS' HOME, TORONTO.

The following summaries show the operations of this Home during the year:

Movements of Inmates.

In residence, 1st October, 1915..	83
Admitted	59
Total number of inmates..	142
Discharged	71
Died	2
In residence, 30th September, 1916	69
	142

Places Admitted From.

City of Toronto	142
County of York	....
Other parts of Ontario	....
	142

The receipts of the Institution during the year, including the Government grant of $652.30, amounted to $10,718.30, and the expenditure $10,835.86.

Government aid for 1916, $487.12.

BOYS' HOME, TORONTO.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	73
Admitted	61
Total number of inmates ..	134
Discharged	45
Died	....
In residence, 30th September, 1916	89
	134

Places Admitted From.	
City of Toronto	134
County of York	....
Counties of Ontario	....
Immigrants, foreigners, etc. ...	....
	134

The receipts of the Home during the year, including the Government grant of $1,642.56, amounted to $14,993.07, and the expenditures were $16,381.39.

Government aid for the year 1916, $613.68.

THE WORKING BOYS' HOME, TORONTO.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	22
Admitted	52
Total number of inmates ..	74
Discharged	60
In residence, 30th September, 1916	14
	74

Sex.	
Male	74
	74

Places Admitted From.	
City of Toronto	20
County of York	....
Counties of Ontario	9
Aliens	45
	74

The receipts of the Home during the year, including the Government grant of $209.42, amounted to $6,124.84, and the expenditures were $6,038.01.

Government aid for the year 1916, $149.20.

THE INFANTS' HOME AND INFIRMARY, TORONTO.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	139
Admitted	148
Total number of inmates ..	287
Discharged	176
Died	32
In residence, 30th September, 1916	79
	287

Sex.	
Male	113
Female	174
	287

Places Admitted From.	
City of Toronto	250
County of York	....
Other Counties in Ontario	37
Immigrants, foreigners, etc. ...	....
	287

The receipts of the Home during the year, including the Government grant of $2,565.76, were $12,761.50, and the expenditures were $11,533.59.

Government aid for the year 1916, $1,385.52.

HOME FOR INCURABLE CHILDREN, TORONTO.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	30
Admitted	5
Total number of inmates ..	35
Discharged	5
Died	1
In residence, 30th September, 1916	29
	35

Sex.	
Male	18
Female	17
	35
Places Admitted From.	
City of Toronto	19
Other Counties in the Province.	14
Immigrants, foreigners, etc. ...	2
	35

The revenue of the Home during the year, including the Government grant of $212.56, amounted to $14,209.94, and the expenditure to $14,307.41.

Government aid for 1916, $215.48.

ST. VINCENT INFANTS' HOME, TORONTO.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	94
Admitted during the year	20
Total number of inmates..	114
Discharged	75
Died	8
In residence, 30th September, 1916	31
	114

Sex.	
Male	53
Female	61
	114
Places Admitted From.	
City of Toronto	112
County of York	....
Other Counties	2
Immigrants, foreigners, etc. ...	....
	114

The revenue of this Home during the year, including the Government grant of $1,396.53, amounted to $3,873.44, and the expenditure to $4,175.29.

Government aid for 1916, $583.35.

ST. MARY'S ORPHAN ASYLUM, HAMILTON.

The following summaries show the operations of this Asylum during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	114
Admitted	70
Total number of inmates ..	184
Discharged	88
Died	....
In residence, 30th September, 1916	96
	184

Sex.	
Male	104
Female	80
	184
Places Admitted From.	
City of Hamilton	88
County of Wentworth	....
Other counties and countries ..	96
	184

Including the Government grant of $704.18, the revenue of the Asylum during the year amounted to $10,034.25, and the expenditure to $10,048.73.

Government aid for 1916, $817.96.

PROTESTANT ORPHAN ASYLUM, HAMILTON.

The following summaries show the operations of this Asylum during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	....
Admitted	....
Total number of inmates ..	....
Discharged	....
Deaths	....
In residence, 30th September, 1916	....
	....

Sex.	
Male	....
Female	....
Places Admitted From.	
City of Hamilton	....
County of Wentworth and other countries	....
	....

The receipts and expenditures are included in the financial statements of the Aged Women's Home, *vide* Schedule "B" Refuge Report.
Government aid for 1916, $

BOYS' HOME, HAMILTON.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	74
Admitted	24
Total number of inmates ..	98
Discharged	32
In residence, 30th September, 1916	66
	98

Places Admitted From.	
Hamilton City	96
County of Wentworth	2
	98

The receipts of the Home during the year, including the Government grant of $526.78, were $9,434.75, and the expenditures were $9,389.11.
Government aid for 1916, $485.40.

GIRLS' HOME, HAMILTON.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	45
Admitted	37
Total number of inmates ..	82
Discharged	31
Number of deaths	..
In residence, 30th September, 1916	51
	82

Places Admitted From.	
City of Hamilton	82
County of Wentworth	....
	82

The revenue of the Home during the year, including the Government grant of $309.08, was $4,952.11, and the expenditure was $4,872.76.
Government aid for 1916, $296.14.

HOME FOR THE FRIENDLESS AND INFANTS' HOME, HAMILTON.

The following summaries show the operations of this Home during the year:

Movements of Inmates.

In residence, 1st October, 1915..	66
Admitted	180
Total number of inmates ..	246
Discharged	180
Died	10
In residence, 30th September, 1916	56
	246

Sex.

Male	97
Female	149
	246

Places Admitted From.

City of Hamilton	200
County of Wentworth	12
Other places and counties	18
Aliens	16
	246

The revenue of the Home, including Government grant of $698.96, was $7,845.38, and the expenditure $6,667.82.

Government aid for 1916, $714.87.

SALVATION ARMY RESCUE HOME, HAMILTON.

The following summaries show the operations of this Asylum during the year:

Movements of Inmates.

In residence, 1st October, 1915..	35
Admitted	41
Total number of inmates ..	76
Discharged	43
Died	3
In residence, 30th September, 1916	30
	76

Sex.

Male	25
Female	51
	76

Places Admitted From.

City of Hamilton	51
County of Wentworth	....
Other counties and countries ..	22
Aliens, etc.	3
	76

The revenue of this Asylum for the year, including the Government grant of $568.19, amounted to $7,757.41, and the expenditure to $7,757.05.

Government aid for 1916, $583.12.

ORPHANS' HOME, KINGSTON.

The following summaries show the operations of this Institution during the year:

Movements of Inmates.

In residence, 1st October, 1915..	73
Admitted	62
Total number of inmates ..	135
Discharged	75
Died	....
In residence, 30th September, 1916	60
	135

Sex.

Male	66
Female	69
	135

Places Admitted From.

City of Kingston	99
County of Frontenac	9
Other counties in Ontario	24
Immigrants, foreigners, etc.	3
	135

The revenue of this Home for the year, including the Government grant of $602.82, was $7,525.32, and the expenditure was $7,588.45.

Government aid for 1916, $461.46.

ST. MARY'S OF THE LAKE ORPHANAGE, KINGSTON.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	99
Admitted	49
Total number of inmates ..	148
Discharged	43
Died	4
In residence, 30th September, 1916	101
	148

Sex.	
Male	86
Female	62
	148
Places Admitted From.	
City of Kingston	65
County of Frontenac	44
Other counties	36
Immigrants, etc.	3
	148

The income of the Asylum during the year, including the Government grant of $802.90, amounted to $8,164.32, and the expenditure to $8,765.35.

Government aid for 1916, $758.28.

ORPHANS' HOME, OTTAWA.

The following summaries show the operations of this Home during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	46
Admitted	103
Total number of inmates ..	149
Discharged	100
Died	....
In residence, 30th September, 1916	49
	149

Sex.	
Male	78
Female	71
	149
Places Admitted From.	
City of Ottawa	128
County of Carleton	3
Other counties	10
Immigrants, etc.	8
	149

The receipts and expenditures are included in the financial statement of the Refuge Branch of the Orphans' Home, Ottawa. See Schedule "B," Refuge Report.

Government aid for 1916, $401.48.

ST. PATRICK'S ORPHAN ASYLUM, OTTAWA.

The following summaries show the operations of this Asylum during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	87
Admitted	86
Total number of inmates ..	173
Discharged	70
Died	....
In residence, 30th September, 1916	103
	173

Sex.	
Male	89
Female	84
	173
Places Admitted From.	
City of Ottawa	141
County of Carleton	12
Other parts of Province	20
Other countries	....
	173

The receipts and expenditures of this Institution are included in the financial statement of the Refuge Department; *vide* Schedule B, Refuge Report.

Government aid for 1916, $708.82.

ST. JOSEPH'S ORPHAN ASYLUM, OTTAWA.

The following summaries show the operations of this Charity during the year:

Movements of Inmates.

In residence, 1st October, 1915..	250
Admitted	100
Total number of inmates ..	350
Discharged	140
Died	1
In residence, 30th September, 1916	209
	350

Sex.

Male	165
Female	185
	350

Places Admitted From. .

City of Ottawa	198
County of Carleton	12
Other counties in Ontario	140
	350

The receipts of the Institution, including Government grant of $1,679.58, were $17,681.36, and the expenditures, $17,751.39.

Government aid for 1916, $1,652.52.

BOYS' HOME, OTTAWA.

The following summaries show the operations of this Home during the year:

Movements of Inmates.

In residence, 1st October, 1915..	12
Admitted	36
Total number of inmates ..	48
Discharged	43
Died	....
In residence, 30th September, 1916	5
	48

Sex.

Male	48
Female	....
	48

Places Admitted From.

City of Ottawa	12
County of Carleton	....
Other counties in Province	36
Immigrants, foreigners, etc. ...	....
	48

The revenue of the Home during the year, including Government grant of $93.80, amounted to $2,654.14, and the expenditures to $2,600.53.

Government aid for 1916, $57.62.

S. A. RESCUE HOME AND CHILDREN'S SHELTER, OTTAWA.

The following summaries show the operations of this Home during the year:

Movements of Inmates.

In residence, 1st October, 1915..	61
Admitted during the year	130
Total number of inmates ..	191
Discharged	123
Died	9
In residence, 30th September, 1916	59
	191

Sex.

Male	62
Female	129
	191

Places Admitted From.

City of Ottawa	166
County of Carleton	5
Other counties	17
Immigrants, foreigners, etc. ...	3
	191

The revenue of the Home, including Government grant of $914.97, was $10,319.77, and the expenditures were $9,871.08.

Government aid for 1916, $835.77.

ROMAN CATHOLIC ORPHANS' HOME, LONDON.

The following summaries show the operations of this Orphanage during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	111
Admitted	120
Total number of inmates ..	231
Discharged	77
Died	20
In residence, 30th September, 1916	134
	231

Sex.	
Male	125
Female	106
	231
Places Admitted From.	
City of London	90
County of Middlesex	14
Other parts of the Province ..	127
	231

The revenue of the Home during the year, including the Government grant of $877.54, amounted to $10,976.68, and the expenditure to $10,970.67.

Government aid for the year 1916, $906.64.

PROTESTANT ORPHANS' HOME, LONDON.

The following summaries show the operations of this Orphanage during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	36
Admitted	60
Total number of inmates ..	96
Discharged	42
Died	....
In residence, 30th September, 1916	54
	96

Sex.	
Male	51
Female	45
	96
Places Admitted From.	
City of London	96
Other counties	....
	96

The revenue of the Home, including the Government grant of $320.24, was $5,516.31, and the expenditures were $5,339.31.

Government aid for 1916, $397.50.

WOMEN'S REFUGE AND INFANTS' HOME, LONDON.

The following summaries show the operations of this Charity during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	13
Admitted	21
Total number of inmates ..	34
Discharged	25
Died	2
In residence, 30th September, 1916	7
	34

Sex.	
Male	....
Female	34
	34
Places Admitted From.	
City of London	34
County of Middlesex	....
Other counties	....
	34

The receipts during the year, including the Government grant of $153.36, were $2,354.79, and the expenditures, $2,623.93.

Government aid for 1916, $138.82.

S. A. RESCUE HOME AND CHILDREN'S SHELTER, LONDON.

The following summaries show the operations of this Home during the year:

Movements of Inmates.

In residence, 1st October, 1915..	23
Admitted	64
Total number of inmates ..	87
Discharged	64
Died	1
In residence, 30th September, 1916	22
	87

Sex.

Male	19
Female	68
	87

Places Admitted From.

City of London	66
Middlesex and other counties ..	20
Immigrants, foreigners, etc. ...	1
	87

The revenue of the Home, including Government grant of $448.12, was $4,304.20, and the expenditure, $4,231.54.

Government aid for 1916, $452.35.

PROTESTANT HOME (ORPHANAGE BRANCH), ST. CATHARINES.

The following summaries show the operations of this Charity during the year:

Movements of Inmates.

In residence, 1st October, 1915..	22
Admitted	60
Total number of inmates ..	82
Discharged	49
Died	....
In residence, 30th September, 1916	33
	82

Sex.

Male	48
Female	34
	82

Places Admitted From.

City of St. Catharines	82
County of Lincoln	....
Other counties	....
Aliens	....
	82

The revenue of the Home during the year, including the Government grant of $166.38, amounted to $4,880.68, and the expenditure, $4,765.39.

Government aid for 1916, $182.80.

ST. AGATHA ORPHAN ASYLUM, ST. AGATHA.

The following summaries show the operations of this Asylum during the year:

Movements of Inmates.

In residence, 1st October, 1915 .	59
Admitted	19
Total number of inmates ..	78
Discharged	26
Died	....
In residence, 30th September, 1916	52
	78

Sex.

Male	34
Female	44
	78

Places Admitted From.

County of Waterloo	78
Other counties	....
Aliens	....
	78

The revenue of the Asylum was $3,755.39, including the Government grant of $437.42, and the expenditure, $3,749.68.

Government aid for 1916, $394.96.

ST. JOSEPH'S ORPHANAGE, FORT WILLIAM.

The following summaries show the operations of this Charity during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	75
Admitted	79
Total number of inmates ..	154
Discharged	67
Died	....
In residence, 30th September, 1916	87
	154

Sex.	
Male	68
Female	86
	154
Places Admitted From.	
District of Thunder Bay	51
Fort William	99
Other counties in the Province	....
Immigrants, etc.	4
	154

The revenue of the Home, including the Government grant of $617.22, was $7,986.27, and the expenditure, $8,336.76.
Government aid for 1916, $680.16.

KITCHENER ORPHANAGE, KITCHENER.

The following summaries show the operations of this Orphanage during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	31
Admitted	83
Total number of inmates ..	114
Discharged	82
Died	....
In residence, 30th September, 1916	32
	114

Sex.	
Male	56
Female	58
	114
Places Admitted From.	
Town of Kitchener	23
County of Waterloo	54
Counties in Ontario	37
Immigrants, etc.	....
	114

The revenue of the Home, including the Government grant of $233.62, was $2,815.97, and the expenditures were $2,830.92.
Government aid for 1916, $236.40.

LOYAL TRUE BLUE ORPHANAGE, PICTON.

The following summaries show the operations of this Orphanage during the year.

Movements of Inmates.	
In residence, 1st October, 1915..	60
Admitted	29
Total number of inmates ..	89
Discharged	19
Died	3
In residence, 30th September, 1916	67
	89

Sex.	
Male	56
Female	33
	89
Places Admitted From.	
City of Toronto	21
County of Prince Edward	7
Other counties of Ontario	61
Aliens	....
	89

The revenue of the Home, including the Government grant of $464.74, was $11,644.34, and the expenditures were $9,075.17.
Government aid for 1916, $455.66.

NAZARETH ORPHANAGE, CORNWALL.

The following summaries show the operations of this Orphanage during the year:

Movements of Inmates.	
In residence, 1st October, 1915..	17
Admitted	43
Total number of inmates ..	60
Discharged	26
Died	1
In residence, 30th September, 1916	33
	60

Sex.	
Male	33
Female	27
	60
Places Admitted From.	
Town of Cornwall	35
County of Stormont	21
Other counties and countries ..	....
Immigrants, etc.	4
	60

The revenues and expenditures of this Orphanage are included in those of the Hotel Dieu Hospital, Cornwall, and cannot be shown separately.

Government aid for 1916, $163.28.

ST. VINCENT'S ORPHANAGE, PETERBOROUGH.

The following summaries show the operations of this Home during the year.

Movements of Inmates.	
In residence, 1st October, 1915..	38
Admitted	29
Total number of inmates ..	67
Discharged	26
Number of deaths	....
In residence, 30th September, 1916	41
	67

Sex.	
Male	34
Female	33
	67
Places Admitted From.	
City of Peterborough	36
County of Peterborough	2
Other counties in the Province ..	29
	67

The revenue of the Home, including the Government grant of $288.08, during the year was $2,493.13, and the expenditures were $2,764.84.

Government aid for 1916, $245.42.

COUNTY HOUSES OF REFUGE

The following returns have been received from the Houses of Refuge maintained by the different Counties in Ontario. These returns show the approximate value of the buildings, contents and land, also the number of acres in connection with each House of Refuge. The receipts and expenditures are also stated, together with the average number of inmates in each Refuge.

COUNTY OF BRANT.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$2,000 00
" " contents	1,800 00
" " land	3,500 00
Number of acres	61

Receipts.

Profits of farm	.....
Received from all other sources	$1,032 76
Amount provided out of taxation and received from Treasurer	7,897 16

Expenditures.

Maintenance of House	$8,838 16
Average number of inmates	66

COUNTY OF BRUCE.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$22,000 00
" " contents	1,200 00
" " land	3,500 00
Number of acres	61

Receipts.

Profits of farm	$292 30
Received from all other sources	282 00
Amount provided out of taxation and received from Treasurer	4,898 64

Expenditures.

Maintenance of House	$4,898 64
Average number of inmates	51

COUNTY OF ELGIN.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$25,431 74
" " contents	2,500 00
" " land	10,506 51
Number of acres	100

Receipts.

Profits of farm	$1,397 32
Received from all other sources	1,095 00
Amount provided out of taxation and received from Treasurer	5,195 11

Expenditures.

Maintenance of House	$5,182 51
For permanent improvements	
Average number of inmates	60

COUNTY OF ESSEX.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$35,000 00
" " contents	5,000 00
" " land	8,000 00
Number of acres	50

Receipts.

Profits of farm	$742 95
Received from all other sources	1,276 14
Amount provided out of taxation and received from Treasurer	.....

Expenditures.

Maintenance and improvements of House	$6,417 10
Average number of inmates	62

COUNTY OF GREY.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$21,000 00
" " contents	3,000 00
" land	5,200 00
Number of acres	97

Receipts.

Profits of farm	$615 18
Received from all other sources	1,746 37
Amount provided out of taxation and received from Treasurer	4,287 10

Expenditures.

Maintenance of House	$5,863 94
Average number of inmates	54

COUNTY OF HALDIMAND.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$25,405 00
" " contents	1,200 00
" " land	3,000 00
Number of acres	50

Receipts.

Profits of farm	$1,050 90
Received from all other sources	340 00
Amount provided out of taxation and received from Treasurer	3,903 23

Expenditures.

Maintenance of House	$2,098 56
Average number of inmates	31

COUNTY OF HASTINGS.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$50,000 00
" " contents	5,000 00
" " land	7,000 00
Number of acres	69

Receipts.

Profits of farm	$7,615 15
Received from all other sources	624 67
Amount provided out of taxation and received from Treasurer	7,700 71

Expenditures.

Maintenance of House	$9,041 53
Average number of inmates	89

COUNTY OF HURON.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$25,000 00
" " contents	2,000 00
" " land	3,000 00
Number of acres	47½

Receipts.

Profits of farm	$1,083 41
Received from all other sources	818 25
Amount provided out of taxation and received from Treasurer	7,917 07

Expenditures.

Maintenance of House	$5,372 41
Average number of inmates	88

COUNTY OF KENT.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$21,000 00
" " contents	1,690 00
" " land	5,000 00
Number of acres	50

Receipts.

Profits of farm	$508 87
Received from all other sources	.....
Amount provided out of taxation and received from Treasurer	5,613 63

Expenditures.

Maintenance of House	$6,122 50
Average number of inmates	57

COUNTY OF LAMBTON.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$36,000 00
" " contents	2,000 00
" " land	6,000 00
Number of acres	60

Receipts.

Profits of farm	$622 00
Received from all other sources	78 00
Amount provided out of taxation and received from Treasurer	6,536 75

Expenditures.

Maintenance of House	$6,536 75
Average number of inmates	38

COUNTY OF LANARK.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$33,000 00
" " contents	5,000 00
" " land	6,500 00
Number of acres	78

Receipts.

Profits of farm	$687 08
Received from other sources	5,769 00
Amount provided out of taxation and received from Treasurer	4,572 20

Expenditures.

Maintenance of House	$11,028 28
Average number of inmates	84

COUNTIES OF LEEDS AND GRENVILLE.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$20,000 00
" " contents	2,000 00
" " land	4,000 00
Number of acres	100

Receipts.

Profits of farm	.....
Received from all other sources	$1,288 15
Amount provided out of taxation and received from Treasurer	2,436 59

Expenditures.

Maintenance of House	$3,724 74
Average number of inmates	56

COUNTY OF LINCOLN.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$25,000 00
" " contents	5,000 00
" " land	20,000 00
Number of acres	72

Receipts.

Profits of farm	$1,261 87
Received from all other sources	2,761 12
Amount provided out of taxation and received from Treasurer	4,578 36

Expenditures.

Maintenance of House and improvements	$8,601 35
Average number of inmates	52

COUNTY OF MIDDLESEX.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$20,000 00
" " contents	2,500 00
" " land	5,000 00
Number of acres	63

Receipts.

Profits of farm	$696 44
Received from all other sources	335 50
Amount provided out of taxation and received from Treasurer	7,926 84

Expenditures.

Maintenance of House	$7,926 84
Average number of inmates	59

COUNTY OF NORFOLK.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$20,000 00
" " contents	5,000 00
" " land	4,500 00
Number of acres	90

Receipts.

Profits of farm	$1,069 73
Received from all other sources	44 25
Amount provided out of taxation and received from Treasurer	5,412 63

Expenditures.

Maintenance of House	$5,016 60
Average number of inmates	57

COUNTIES OF NORTHUMBERLAND AND DURHAM.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$46,000 00
" " contents	2,500 00
" " land	5,000 00
Number of acres	45

Receipts.

Profits of farm	$2,623 75
Received from all other sources	1,073 89
Amount provided out of taxation and received from Treasurer	11,330 50

Expenditures.

Maintenance of House and permanent improvements	$12,404 39
Average number of inmates	88

COUNTY OF ONTARIO.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$28,000 00
" " contents	.....
" " land	4,050 00
Number of acres	48

Receipts.

Profits of farm	$659 20
Received from all other sources	234 61
Amount provided out of taxation and received from Treasurer	10,045 76

Expenditures.

Maintenance of House	$9,151 89
Average number of inmates	69

COUNTY OF OXFORD.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$30,000 00
" " contents	7,318 00
" " land	6,500 00
Number of acres	100

Receipts.

Profits of farm	$1,442 27
Received from all other sources	694 44
Amount provided out of taxation and received from Treasurer	6,604 59

Expenditures.

Maintenance of House	$8,731 30
Average number of inmates	77

COUNTIES OF PEEL AND HALTON.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$13,500 00
" " contents	2,500 00
" " land	5,000 00
Number of acres	50

Receipts.

Profits of farm	.....
Received from all sources	$820 11
Amount provided out of taxation and received from Treasurer	5,933 44

Expenditures.

Maintenance of House, net cost	$6,753 25
Average number of inmates	47

COUNTY OF PERTH.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$20,000 00
" " contents	3,000 00
" " land	4,000 00
Number of acres	53

Receipts.

Profits of farm	$425 39
Received from all other sources	735 15
Amount provided out of taxation and received from Treasurer	6,884 51

Expenditures.

Maintenance of House	$8,045 03
Average number of inmates	60

COUNTY OF PETERBOROUGH.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$25,150 00
" " contents	2,150 00
" " land	7,200 00
Number of acres	96

Receipts.

Profits of farm	$699 20
Received from all other sources	42 20
Amount provided out of taxation and received from Treasurer	7,364 86

Expenditures.

Maintenance of House	$5,686 84
Average number of inmates	36

COUNTIES OF PRESCOTT AND RUSSELL.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$30,000 00
" " contents	5,000 00
" " land	2,000 00
Number of acres	100

Receipts.

Profits of farm	$719 65
Received from all other sources	1,203 62
Amount provided out of taxation and received from Treasurer	7,979 17

Expenditures.

Maintenance of House	$6,056 50
Average number of inmates	61

COUNTY OF PRINCE EDWARD.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$30,000 00
" " contents	2,500 00
" " land	4,500 00
Number of acres	45

Receipts.

Profits of farm	$316 92
Received from all other sources	399 77
Amount provided out of taxation and received from Treasurer	3,734 68

Expenditures.

Maintenance of House	$4,500 37
Average number of inmates	43

COUNTY OF SIMCOE.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$35,300 00
" " contents	11,107 69
" " land	7,000 00
Number of acres	100

Receipts.

Profits on farm	$1,328 58
Received from all other sources	359 70
Amount provided out of taxation and received from Treasurer, including improvements	12,419 70

Expenditures.

Maintenance of House	$12,419 70
Average number of inmates	101

COUNTIES OF STORMONT, DUNDAS AND GLENGARRY.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$60,000 00
" " contents	6,734 00
" " land	6,000 00
Number of acres	140

Receipts.

Profits of farm	$476 56
Received from all other sources	268 86
Amount provided out of taxation and received from Treasurer	5,000 00

Expenditures.

Maintenance of House	$7,468 65
Average number of inmates	41

COUNTY OF VICTORIA.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$35,238 64
" " contents	7,600 47
" " land	8,344 77
Number of acres	70

Receipts.

Profits of farm	$1,062 68
Received from all other sources	422 24
Amount provided out of taxation and received from Treasurer	5,924 34

Expenditures.

Maintenance of House	$7,409 26
Average number of inmates	50

COUNTY OF WATERLOO.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$35,000 00
" " contents	5,000 00
" " land	15,000 00
Number of acres	100

Receipts.

Profits of farm	$5,196 78
Received from all other sources	654 80
Amount provided out of taxation and received from Treasurer	6,690 49

Expenditures.

Maintenance of House	$12,542 07
Average number of inmates	110

COUNTY OF WELLAND.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$25,000 00
" " contents	2,200 00
" " land	3,600 00
Number of acres	60

Receipts.

Profits of farm	$893 12
Received from all other sources	1,557 61
Amount provided out of taxation and received from Treasurer	7,417 45

Expenditures.

Maintenance of House	$9,868 18
Average number of inmates	62

COUNTY OF WELLINGTON.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$35,000 00
" " contents	5,000 00
" " land	4,000 00
Number of acres	58

Receipts.

Profits of farm	$629 75
Received from all other sources	1,527 99
Amount provided out of taxation and received from Treasurer	7,800 00

Expenditures.

Maintenance of House	$6,143 93
Average number of inmates	61

COUNTY OF WENTWORTH.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$30,000 00
" " contents	6,000 00
" " land	14,000 00
Number of acres	

Receipts.

Profits of farm	$3,501 42
Received from all other sources	476 34
Amount provided out of taxation and received from Treasurer	5,271 13

Expenditures.

Maintenance of house, $2,730.74; live stock, $95.50; equipments, $425.86, and permanent improvements, $1,075.69	$5,271 13
Average number of inmates	38

COUNTY OF YORK.

Statement showing value of property, receipts, expenditures, and average number of inmates.

Approximate value of buildings	$13,700 00
" " contents	3,000 00
" " land	10,000 00
Number of acres	70

Receipts.

Profits of farm	$838 33
Received from all other sources	403 97
Amount provided out of taxation and received from Treasurer	7,625 00

Expenditures.

Maintenance of House	$8,627 13
Average number of inmates	70

Forty-Ninth Annual Report

OF THE

Inspector of Prisons and Public Charities

UPON THE

Prisons and Reformatories

OF THE

PROVINCE OF ONTARIO

BEING FOR THE YEAR ENDING 31st OCTOBER

1916

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1917

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Corner Queen and John Streets
TORONTO

PARLIAMENT BUILDINGS, TORONTO, January 26th, 1917.

To His Honour JOHN STRATHEARN HENDRIE, C.V.O.. a Colonel in the Militia of Canada, etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I beg to submit herewith the Forty-ninth Annual Report upon the Prisons and Reformatories, being for the year ending 31st October, 1916.

I have the honour to be,

Your Honour's most obedient servant,

W. D. MCPHERSON,

Provincial Secretary.

Toronto, November 14th, 1916.

Sir,—

I have the honour to submit herewith to be presented to His Honour the Lieutenant-Governor, the Forty-ninth Annual Report upon the Common Gaols of the Province of Ontario, being for the official year ending 30th September, 1916.

I have the honour to be, Sir,

Your obedient servant,

W. W. Dunlop.

Inspector.

The Honourable W. D. McPherson, M.P.P.,
Secretary of the Province of Ontario,
Toronto.

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FORTY-NINTH ANNUAL REPORT

UPON THE

Gaols and District Lock-ups of Ontario

In presenting the Forty-ninth Annual Report of the Gaols and Lock-ups of Ontario, I beg to submit the following statistics for the year ending September 30th, 1916.

(1) Number of Gaols in Ontario 46
Number of Provincial Lock-ups 4

(2) Total expenditure for Gaol maintenance in Ontario:

In 1915	$214,986 32
In 1916	195,291 74
Decrease	$19,694 58

(3) The cash revenue from Gaol labour during 1916 was $2,238.00, and was earned at Kingston, Perth and Ottawa.

Average cost per day for each prisoner in the County Gaols of Ontario was:

In 1915	25.12 cents.
In 1916	30.09 cents.

(4) Number of persons committed to Gaols and Lock-ups during the past two years was:

In 1915	20,337
In 1916	16,100
Decrease during the past year	4,237
Commitments for murder in 1915	29
Commitments for murder in 1916	35
Increase	6
Commitments for manslaughter in 1915	20
Commitments for manslaughter in 1916	11
Decrease	9

Commitments for crime against the person:

In 1915	942
In 1916	885
Decrease	57

Commitments for crime against property:

In 1915	5,363
In 1916	2,818
Decrease	2,545

Commitments for crime against public morals and decency:

In 1915	1,254
In 1916	1,002
Decrease	252

Commitments for crime against public order and peace:

In 1915	10,810
In 1916	8,997
Decrease	1,813

Number of insane committed to Gaols:

In 1915	218
In 1916	206
Decrease	12

Prisoners sentenced to the Penitentiary during the past year show a decrease of 93 as compared with the previous year, and the number transferred to the Central Prison was 63, less than in 1915.

Number of prisoners sentenced in 1915	12,663
Number of prisoners sentenced in 1916	9,364
Decrease	3,299

The percentage of sentences to commitments was:

In 1915	62.2
In 1916	58.1

The number of prisoners sentenced to terms over one year was 95 less than during the previous year.

The number confined in penal institutions of Ontario was 392 less on September 30th, 1916, than on the same date last year.

Of these committed during the year, 5,849 were married and 10,251 were single.

Habits of life of those committed to Gaols:

In 1915, number of commitments, 20,337; temperate, 5,846; percentage, 28.74.

In 1916, number of commitments, 16,100; temperate, 4,066; percentage, 25.25.

12.41 per cent. of the prisoners committed to the gaols during the past year could not read or write.

Number of days' stay of prisoners:

In 1915	343,938
In 1916	232,051
Showing a decrease of days	111,887

Escapes and captures:

Twenty-one prisoners escaped during the year, of whom ten were recaptured.

Deaths in Gaols:

In 1915	10
In 1916	13

COMMON GAOLS.

The following table shows the number of prisoners committed to the Common Gaols in the Province in each year, from 1st October, 1869, to 30th September, 1916.

Date of Commitment.	Men over 16 years of age.	Boys under 16 years of age.	Women over 16 years of age.	Girls under 16 years of age.	Totals.
Commitments for the year ending 30th September, 1869	3,599	294	1,680	82	5,655
" " 1870	4,215	319	1,737	108	6,379
" " 1871	4,586	329	1,642	58	6,615
" " 1872	5.006	281	1,615	56	6,958
" " 1873	5.745	323	1,735	74	7.877
" " 1874	7,298	377	1,746	67	9,488
" " 1875	8,048	389	1,566	70	10,073
" " 1876	9,005	434	1,727	70	11,236
" " 1877	11,653	542	1,824	62	13,481
" " 1878	9,537	480	1.959	54	12,030
" " 1879	8,995	416	1,756	53	11,220
" " 1880	8,229	549	1,863	59	11,300
" " 1881	7.007	468	1,681	73	9,229
" " 1882	2,286	522	1,750	62	9,620
" " 1883	7.858	423	1,551	48	9,880
" " 1884	9,858	458	1,719	46	12,081
" " 1885	9,419	450	1,507	50	11.426
" " 1886	8,831	352	1,424	38	10,655
" " 1887	8.996	409	1,574	38	11,017
" " 1888	10,060	551	1,778	65	12,454
" " 1889	10,349	451	1,685	46	12,531
" " 1890	9,622	461	1,677	50	11,810
" " 1891	8.460	421	1,501	32	10,423
" " 1892	7,177	446	1,335	53	9,011
" " 1893	6.798	388	1,399	34	8,619
" " 1894	7,785	278	1,350	37	9,450
" " 1895	7,912	284	1,154	30	9,380
" " 1896	7.622	265	1,147	24	9.058
" " 1897	7,533	235	1,069	47	8,884
" " 1898	6.974	284	969	29	8,256
" " 1899	6,846	267	1,057	33	8.203
" " 1900	7,063	298	1,291	42	8,694
" " 1901	7,059	262	1,198	27	8,546
" " 1902	6,850	216	1,199	15	8,280
" " 1903	7,815	225	1,200	21	9,261
" " 1904	8,810	156	1,165	15	10,146
" " 1905	9,668	113	1,232	22	11,035
" " 1906	9,541	136	1,124	9	10,810
" " 1907	10,489	87	1,217	11	11,804
" " 1908	11.670	76	1,323	14	13.083
" " 1909	11.935	87	1,501	12	13,535
" " 1910	12,073	87	1,514	13	13,687
" " 1911	13,572	91	1,600	12	15,275
" " 1912	15,238	91	1,645	11	16,985
" " 1913	17,442	85	1.713	10	19.250
" " 1914	21,024	84	1,665	4	22,777
" " 1915	18,566	90	1,669	12	20,337
" " 1916	14,506	80	1,502	12	16,100

The next table shows the number of prisoners (male and female) committed to each gaol during 1915 and 1916, and the increase and decrease in the commitments of the latter year compared with the former.

Name of Gaol.	Number of prisoners committed in the year ending 30th Sept., 1915.			Number of prisoners committed in the year ending 30th Sept., 1916.			Increase.			Decrease.		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Barrie	233	10	243	193	11	204	....	1	1	40	....	40
Kitchener	152	9	161	149	12	161	....	3	3	3	....	3
Belleville	441	26	467	284	38	322	....	12	12	157	....	157
Brantford	314	19	333	326	11	337	12	....	12	....	8	8
Brampton	52	2	54	27	2	29	....	....	.....	25	....	25
Brockville	131	5	136	176	23	199	45	18	63	....	....	....
Bracebridge	44	5	49	20	2	22	....	....	.....	24	3	27
Cayuga	95	2	97	60	2	62	....	....	.....	35	....	35
Cornwall	96	5	101	66	7	73	....	2	2	30	....	30
Cobourg	113	7	120	144	4	148	31	....	31	....	3	3
Chatham	189	9	198	208	13	221	19	4	23	....	....	....
Fort Frances	235	9	244	140	4	144	....	....	.....	95	5	100
Goderich	59	.....	59	50	1	51	....	1	1	9	....	9
Guelph	97	8	105	67	5	72	....	....	.....	30	3	33
Gore Bay	18	1	19	15	4	19	....	3	3	3	....	3
Hamilton	1,188	108	1,296	1,544	134	1,678	356	26	382	....	....	....
Kingston	315	35	350	210	18	228	....	....	.....	105	17	122
Kenora	55	5	60	22	2	24	....	....	.....	33	3	36
London	910	54	964	749	87	836	....	33	33	161	....	161
Lindsay	45	3	48	28	3	31	....	....	.....	17	....	17
L'Orignal	29	8	37	27	1	28	....	....	.....	2	7	9
Milton	408	1	409	183	2	185	....	1	1	225	....	225
Napanee	62	7	69	53	4	57	....	....	.....	9	3	12
North Bay	323	24	347	152	19	171	....	....	.....	171	5	176
Ottawa	1,011	164	1,175	703	160	863	....	....	.....	308	4	312
Owen Sound	122	9	131	76	8	84	....	....	.....	46	1	47
Orangeville	28	4	32	27	3	30	....	....	.....	1	1	2
Perth	105	1	106	72	5	77	....	4	4	33	....	33
Picton	86	2	88	95	1	96	9	....	9	....	1	1
Pembroke	120	2	122	110	3	113	....	1	1	10	....	10
Peterborough	278	27	305	223	44	267	....	17	17	55	....	55
Port Arthur	780	30	810	329	24	353	....	....	.....	451	6	457
Parry Sound	235	6	241	849	12	861	614	6	620	....	....	....
Simcoe	91	7	98	103	3	106	12	....	12	....	4	4
St. Catharines	221	7	228	238	5	243	17	....	17	....	2	2
Sarnia	294	5	299	233	12	245	....	7	7	61	....	61
Stratford	147	4	151	104	5	109	....	1	1	43	....	43
Sandwich	295	9	304	177	15	192	....	6	6	118	....	118
St. Thomas	134	15	149	98	18	116	....	3	3	36	....	36
Sault Ste. Marie	295	26	321	207	29	236	....	3	3	88	....	88
Sudbury	1,832	52	1,884	1,117	47	1,164	....	....	.....	715	5	720
Toronto	5,929	908	6,837	4,239	673	4,912	....	....	.....	1690	235	1925
Walkerton	72	3	75	39	3	42	....	....	.....	33	....	33
Woodstock	237	11	248	250	5	255	13	....	13	....	6	6
Welland	417	15	432	220	11	231	....	....	.....	197	4	201
Whitby	124	5	129	83	1	84	....	....	.....	41	4	45
Lock-ups:												
Atikokan	2	.....	2	.....	.....	.....	....	....	.....	2	....	2
Byng Inlet	14	.....	14	9	.....	9	....	....	.....	5	....	5
Cobalt	170	13	183	81	19	100	....	6	6	89	....	89
Mine Centre	7	.....	7	10	.....	10	3	....	3	....	....	....
	18,650	1,687	20,337	14,585	1,515	16,100	1131	158	1,289	5196	330	5526

The number of commitments in five-year periods for the past fifteen years is shown in the subjoined tables divided into five classes:

1. CRIMES AGAINST THE PERSON.

Nature of crime.	1902 to 1906	1907 to 1911	1912	1913	1914	1915	1916
Assault, common	1,729	2,091	467	537	605	522	479
Assault, felonious	883	1,087	254	156	224	206	212
Cutting and wounding, stabbing and shooting with intent	350	475	108	114	152	90	82
Rape and assault with intent	245	272	64	68	61	45	51
Murder	130	144	24	31	31	29	35
Manslaughter	60	55	16	12	13	20	11
Attempt at suicide	85	123	25	29	28	30	15
Miscellaneous	14	68	129	190	63	.....	.....
Totals	3,496	4,315	1,087	1,137	1,177	942	885

2. CRIMES AGAINST PROPERTY.

Nature of crime.	1902 to 1906	1907 to 1911	1912	1913	1914	1915	1916
Arson and incendiarism	156	134	33	93	48	36	28
Burglary	279	343	90	56	100	85	104
Counterfeiting and passing counterfeit money	31	31	1	5	10	3	1
Destroying and injuring property	333	279	78	87	94	74	51
Embezzlement	28	44	21	2	3	7	2
Forgery	233	407	114	93	102	89	64
Fraud and obtaining money or goods under false pretenses	627	1,059	290	316	468	466	317
Horse, cattle and sheep stealing	253	234	47	36	44	45	34
Housebreaking and robbery	723	929	252	263	378	350	191
Larceny	7,257	10,548	2,413	2,284	2,861	2,904	1,597
Receiving stolen goods	138	267	97	59	68	120	60
Trespass	1,928	1,919	474	631	1,202	1,003	201
Miscellaneous	.....	136	232	200	105	181	168
Totals	11,986	16,390	4,142	4,125	5,483	5,363	2,818

3. CRIMES AGAINST PUBLIC MORALS AND DECENCY.

Nature of crime.	1902 to 1906	1907 to 1911	1912	1913	1914	1915	1916
Bigamy	106	159	29	27	64	36	48
Inmates and frequenters of houses of ill-fame	769	959	293	288	304	464	371
Keeping houses of ill-fame	443	698	222	223	247	422	306
Perjury	103	206	33	15	42	31	44
Seduction	106	252	36	56	50	69	44
Indecent Assault and exposure	455	616	160	199	217	178	126
Miscellaneous	210	204	8	10	55	54	63
Totals	2,192	3,094	781	818	979	1,254	1,002

4. OFFENCES AGAINST PUBLIC ORDER AND PEACE.

Nature of crime.	1902 to 1906	1907 to 1911	1912	1913	1914	1915	1916
Abusive and obscene language	172	160	31	27	24	25	34
Breaches of Peace, breaches of by-laws, escapes from and obstructing constables	841	1.066	180	282	246	288	251
Carrying unlawful weapons	207	299	59	60	114	63	43
Deserting employment	333	72	16	6	3	42	163
Drunk and disorderly	17,624	25,685	6,613	8,363	8,848	6,235	5,968
Selling liquor without license, and selling or giving it to Indians	188	857	298	179	255	313	419
Threatening and seditious language	106	184	44	38	33	30	37
Vagrancy	7,900	10,233	2,675	2,907	3,959	3,774	2,013
Miscellaneous	698	322	67	25	89	40	69
Totals	28,069	38,878	9,983	11,887	13,571	10,810	8,997

5. OTHER CAUSES FOR WHICH PERSONS WERE DETAINED AS PRISONERS.

Nature of crime.	1902 to 1906	1907 to 1911	1912	1913	1914	1915	1916
Contempt of Court	345	306	62	68	141	58	109
Debtors	53	62	26	24	45	26	10
Detained as witnesses	73	109	31	62	31	43	25
Lunatics and persons dangerous to be at large	1,897	1.862	512	491	338	218	206
Non-payment of fines and costs	.....	3	.....	.....	.....	.....	.....
Want of sureties to keep the peace	119	333	91	61	38	31	32
Other offences not classified in foregoing	1,292	2,318	270	577	974	1,592	2,016
Totals	3,779	4,993	992	1,283	1,567	1,968	2,398
Total number of persons committed for the respective years	49,532	67,670	16,985	19,250	22,777	20,337	16,100

STATISTICAL TABLES

A table showing the number of commitments to each gaol for drunkenness during
compared, and the increase or de-

Name of gaol.	1890.	1891.	1892.	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.
Barrie	34	34	19	10	21	9	24	21	11	10	16
Belleville	17	13	4	6	7	7	10	12	10	7	4
Brantford	49	34	18	24	25	19	16	12	13	16	12
Brampton	182	112	89	120	125	124	106	115	85	64	88
Brockville	30	17	.....	9	9	11	6	2	3	4	4
Bracebridge	58	44	44	77	86	70	43	48	49	45	41
Cayuga	15	19	5	5	5	4	4	3	2	3	.....
Cornwall	15	22	7	.....	5	6	6	9	10	13	10
Cobourg	25	14	22	27	10	24	9	11	28	21	19
Chatham	38	22	25	11	19	18	16	12	15	20	10
Fort Frances	71	47	26	28	22	67	9	13	13	15	18
Goderich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Guelph	5	5	2	3	3	.....	.....	2	1	2	5
Gore Bay	10	4	14	9	23	17	7	9	9	3	13
Hamilton	4	1	2	1	2	3	.....	.....	.....	.....	....
Kingston	418	251	142	148	55	36	60	56	60	66	96
Kitchener	120	125	87	102	72	89	49	51	50	48	31
Kenora	66	66	81	75	65	31	76	26	111	110	23
London	332	213	150	218	219	187	177	139	163	172	137
Lindsay	5	1	5	2	5	2	5	4	5	6	7
L'Orignal	.....	5	1	2	1	3	2	2	.....	2	2
Milton	9	9	6	4	8	3	8	3	4	2	4
Napanee	22	23	12	9	20	8	6	5	13	4	7
North Bay	35	16	14	15	7	10	5	.....	4	.....	3
Ottawa	326	204	182	105	111	157	152	165	137	135	224
Owen Sound	17	13	14	11	6	.....	8	6	11	7	8
Orangeville	2	1	2	.....	.....	.....	.....	.....	1	.....	3
Perth	5	5	3	2	3	6	2	2	7	9	7
Picton	33	19	11	11	21	11	22	31	23	30	35
Pembroke	1	..	5	7	4	7	3	5	5	.....	1
Peterborough	45	24	22	16	15	13	10	11	11	10	6
Port Arthur	12	4	3	4	1	3	5	12	4	2	9
Parry Sound	9	.....	2	4	5	7	2	3	3	5	8
Simcoe	3	10	5	3	11	17	6	6	16	10	11
St. Catharines	24	12	9	21	17	26	23	5	17	10	15
Sarnia	108	95	27	36	69	116	57	62	49	61	48
Stratford	14	4	7	9	15	7	10	15	5	1	9
Sandwich	35	57	38	11	19	39	16	23	20	16	27
St. Thomas	20	32	12	15	19	22	13	12	8	17	23
Sault Ste. Marie	12	10	12	8	5	2	12	9	8	7	7
Sudbury	55	77	5	119	38	42	25	41	34	54	197
Toronto	2,085	1,783	1,444	1,207	960	918	790	569	592	796	1,031
Walkerton	6	7	3	13	8	21	5	3	1	4	4
Woodstock	51	34	24	38	21	29	37	35	32	31	21
Welland	16	7	13	12	11	19	17	16	14	19	20
Whitby	2	.....	1	2	1	2	.....	1	4	5	2
Lock-ups :											
Atikokan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Burk's Falls	1	.....	.....	.....	.....	2	1	.....	1	.....	.....
Byng Inlet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cobalt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Killarney	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manitowaning	33	33	22	16	5	16	4	2	4	5	7
Mine Centre	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Webbwood	.....	.....	.....	.....	.....	.....	9	7	6	2	9
Totals	4,475	3,528	2,641	2,575	2,174	2,236	1,873	1,596	1,672	1,869	2,282

the years 1890 to 1916, both inclusive. The figures for 1915 and 1916 are
crease in each place is shown.

1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	Increase, 1916.	Decrease, 1916.
12	21	14	16	27	46	58	39	29	59	51	57	64	140	73	43	.....	30
4	11	15	10	17	19	9	12	15	13	18	24	30	48	34	32	.....	2
11	20	6	12	6	15	34	67	33	61	89	56	110	63	106	57	.....	49
74	82	136	162	143	153	239	178	148	122	129	161	131	108	162	193	31	.....
4	5	3	4	8	10	5	1	5	1	10	8	14	2	11	4	.....	7
58	66	55	50	50	91	86	63	40	54	59	49	83	62	56	60	4	.....
5	5	9	8	13	7	3	9	6	6	3	1	3	4	1	.....	.....	1
19	12	5	11	10	13	7	4	3	5	5	6	4	5	7	10	3	.....
12	15	18	17	14	7	7	12	32	16	10	9	16	27	20	9	.....	11
16	14	12	12	7	18	21	16	27	36	22	35	39	36	16	60	44	.....
18	11	9	8	16	16	27	28	30	36	36	44	46	83	55	84	29	.....
.....	33	.....	.....	42	.....	15	15	16	28	55	57	184	149	52	42	.....	10
5	1	2	8	14	3	1	3	18	5	8	6	13	6	13	8	.....	5
4	13	4	6	12	7	6	4	5	10	7	3	9	16	14	2	.....	12
.....	1	3	3	.....	6	2	7	2	.....	5	1	.....	.....	3	4	1	.....
108	97	188	229	287	290	394	360	413	479	580	702	986	603	494	761	267	.....
47	40	58	62	59	54	66	64	83	109	90	107	135	129	203	115	.....	88
34	36	37	21	19	19	88	92	33	6	15	101	25	19	7	8	1	.....
137	250	157	262	249	248	218	328	424	325	395	361	483	500	520	473	.....	47
8	8	8	10	10	2	6	11	8	12	30	7	3	9	5	3	.....	2
.....	3	1	3	4	2	.....	1	1	.....	2	1	5	2	1	1	.....	.....
4	4	8	12	7	11	6	6	8	7	4	12	11	12	4	8	4	.....
4	7	3	5	8	13	12	19	21	18	21	23	25	45	18	18	.....	.....
12	5	73	99	171	73	103	46	38	40	18	88	90	93	55	19	.....	36
293	221	267	247	338	257	338	425	380	408	307	324	248	346	281	177	.....	104
12	16	13	10	5	6	10	13	15	41	73	65	18	17	24	10	.....	14
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	3	1	1	1	.....	.....	1
12	17	34	20	2	20	24	27	17	19	8	20	31	22	19	13	.....	6
19	21	18	18	28	8	21	42	25	33	31	26	28	32	47	50	3	.....
4	1	7	1	6	7	8	11	20	7	8	20	50	50	44	27	.....	17
13	9	14	23	13	24	33	22	27	23	40	37	119	143	87	71	.....	16
8	7	50	25	27	67	164	183	209	195	232	301	434	444	212	111	.....	101
4	5	25	10	35	153	68	26	25	28	35	50	58	55	79	516	437	.....
6	12	11	15	12	13	28	50	37	37	39	41	8	32	25	26	1	.....
33	21	28	20	33	20	20	25	43	42	73	67	60	102	82	80	.....	2
45	71	57	69	67	73	69	59	80	92	76	90	157	237	138	132	.....	6
12	8	15	19	46	35	21	42	24	29	29	36	67	73	34	36	2	.....
18	31	42	29	19	32	29	38	23	28	32	31	65	44	31	28	.....	3
9	6	5	8	2	4	3	12	15	19	11	5	17	48	30	12	.....	18
21	16	79	15	38	18	32	47	23	32	49	66	75	73	75	39	.....	36
222	172	49	164	117	253	281	223	268	288	316	508	1,054	1,643	658	531	.....	127
1,022	1,107	1,286	1,575	1,832	1,923	2,016	2,003	2,208	2,398	2,669	2,866	3,209	3,073	2,217	1,939	.....	278
.....	1	1	1	.....	5	8	4	4	6	9	6	5	4	9	4	.....	5
39	36	41	31	22	17	24	34	31	32	41	45	52	77	69	86	17	.....
24	23	24	87	32	24	23	28	21	26	29	55	60	131	110	30	.....	80
3	5	2	11	10	29	12	8	18	14	12	8	10	17	14	16	2	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	1	1	4	4	3	5	2	.....	7	4	.....	1	.....	.....	.....	.....	.....
.....	.....	.....	.....	5	.....	.....	.....	.....	.....	11	.....	.....	.....	4	6	2	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	29	25	10	1	20	11	13	2	.....
.....	.....	.....	.....	8	.....	10	10	16	4	3	.....	2	.....	.....	.....	.....	.....
10	12	3	6	21	.....	9	9	8	1	2	7	20	.....	.....	.....	.....	.....
.....	.....	.....	.....	10	.....	23	.....	12	5	.....	6	4	3	4	1	.....	3
17	48	17	14	16	18	56	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2 446	2,627	2,913	3,452	3,941	4,133	4,748	4,736	4,987	5,291	5,827	6,613	8,363	8,848	6,235	5,968	850	1,117

The disposition made of the persons committed to the gaols of the Province is set forth in the table printed below:

	1916
Acquitted on being brought to trial, and discharged	3,642
Discharged without trial by order of judges, magistrates and courts, including remand cases	1,013
Detained for want of securities to keep the peace	25
Detained as witnesses	34
Detained as fraudulent debtors	21
Detained as lunatics, idiots and persons unsafe to be at large	206
Died before trial	19
Detained by civil processes other than above	33
Waiting trial and otherwise detained on 30th September, 1914	91
Found guilty and sentenced	9,364
Discharged under suspended sentence	1,652
Total number of commitments	16,100

The places of confinement to which the convicted persons were sentenced are set forth in the following statement, and similar information is given as regards the sentenced prisoners of the previous year:

	1915	1916
Sentenced to Kingston Penitentiary	288	195
do to the Industrial School	22	25
do direct to Central Prison	846	694
do to the Common Gaols and subsequently transferred to the Central Prison	523	460
do direct to the Reformatory for Females	122	163
do to the Common Gaols and subsequently transferred to the Reformatory for Females	24	50
do to the Common Gaols and there detained until the expiration of sentence	10,828	7,764
Died while undergoing sentence	10	13
Totals	12,663	9,364

The summaries given below show the nature of the offence committed by the convicted persons:

1. *Crimes against the Person.*

	Total commitments for the year.	Number found guilty and sentenced.
Assault, common	479	299
Assault, felonious	212	92
Cutting and wounding, stabbing and shooting with intent	82	30
Rape and assault with intent	51	13
Murder	35	5
Manslaughter	11	1
Attempted suicide	15	1
Totals	885	441

2. *Crimes against Property.*

	Total commitments for the year.	Number found guilty and sentenced.
Arson and incendiarism	28	9
Burglary	104	55
Counterfeiting and passing counterfeit money	1	..
Destroying and injuring property	51	27
Embezzlement	2	..
Forgery	64	36
Fraud and obtaining money and goods under false pretences	317	152
Horse, cattle and sheep stealing	34	19
Housebreaking and robbery	191	117

Larceny	1,597	890
Receiving stolen goods	60	37
Trespass	201	149
Miscellaneous	168	61
Totals	2,818	1,552

3. *Crimes against Public Morals and Decency.*

	Total commitments for the year.	Number found guilty and sentenced.
Bigamy	48	35
Inmates and frequenters of houses of ill-fame	371	169
Keeping houses of ill-fame	306	192
Perjury	44	16
Seduction	44	12
Indecent assault and exposure	126	75
Miscellaneous	63	33
Totals	1,002	532

4. *Offences against Public Order and Peace.*

	Total commitments for the year.	Number found guilty and sentenced.
Abusive and obscene language	34	25
Breaches of peace, breaches of by-laws, escapes from and obstructing constables	251	181
Carrying unlawful weapons	43	22
Deserting employment, etc.	163	108
Drunk and disorderly	5,968	3,911
Selling liquor without a license and selling or giving it to Indians	419	366
Threatening and seditious language	37	9
Vagrancy	2,013	1,094
Miscellaneous	69	49
Total	8,997	5,765
Contempt of court, lunatics, etc.	382	52
Other offences, not classified in foregoing	2,016	1,022
Grand total	16,100	9,364

The following tables show the period of sentence passed on the convicted prisoners and the sex, social conditions, habits, etc., of the total number of prisoners committed:

Periods of Sentence.

	1915	1916
For periods under thirty days	5,013	4,058
For thirty days and up to sixty days, or two months, not including the last term	3,342	2,035
For sixty days, or two months	869	654
Over two months to three months	1,216	903
Over three months to four months	333	244
Over four months to five months	129	76
Over five months to six months	831	690
Over six months to nine months	113	65
Over nine months up to one year, inclusive	213	242
Over one year and up to two years	346	171
Over two years and up to three years in the Penitentiary	120	139
Over three years in the Penitentiary	84	45
For periods of any length in the Industrial Schools	32	36
Sentences to death and executed	3	3
Sentenced to death and commuted to imprisonment	4	..
Sentenced to imprisonment with corporal punishment	15	3
	12,663	9,364

Sex.

	1915	1916
Male	18,656	14,585
Female	1,681	1,515
	20,337	16,100

Social Conditions.

Married	7,227	5,849
Unmarried	13,110	10,251
	20,337	16,100

Habits.

Temperate	5,846	4,066
Intemperate	14,491	12,034
	20,337	16,100

Educational Status.

Could read and write	14,491	14,102
Could neither read nor write	5,846	1,998
	20,337	16,100

Nationality.

Canadian	9,606
English	1,591
Irish	759
Scotch	662
United States	841
Other countries	2,641
	16,100

Religious Denomination.

Roman Catholic	6,256
English Church	3,416
Presbyterian	2,174
Methodist	2,182
Other denominations	2,072
	16,100

The number of prisoners confined in the various custodial institutions of the Province at the close of the past official year, and the year preceding, is exhibited in the following summary:

	1915	1916
In the Common Gaols	632	450
In Ontario Reformatory, Guelph	595	402
In the Reformatory for Females and Refuge for Girls, Toronto	101	110
In the Dominion Penitentiary, Kingston	566	540
	1,894	1,502

Statistical Tables.

Following this portion of the report will be found the tables named in the list given hereunder:

Table No. 2, showing the total number of prisoners in the several gaols on the 30th September, 1916, and the nature of their imprisonment; also showing number of cells in each gaol.

Table No. 3, showing the number of prisoners over and under 16 years of age, the number of recommitals, the number of persons acquitted on being brought to trial, and the number of persons committed under civil processes.

Table No. 4, showing the offences for which prisoners were sentenced.

Table No. 5, showing the number of prisoners, male and female, sentenced under each offence during the year.

Table No. 6, showing the social status and habits of the prisoners committed during the year.

Table No. 7, showing the number of prisoners upon whom sentence was passed, the nature of the sentences, and the operation of the County Judge's Criminal Courts.

Table No. 8, showing how the prisoners committed during the year were maintained, the cost thereof, and the salaries of officials.

Table No. 9, showing the number of escapes and deaths, the revenue derived from prison labor, the cost of diet, accommodation of the gaols, and the highest and lowest number of prisoners in custody in each gaol during the year.

Table No. 10, showing the daily cost per prisoner in each of the gaols of the Province for the year ending 30th September, 1916.

Table No. 11, showing the number of prisoners, male and female, sentenced during the year ending 30th September, 1916, and a comparison of the same with the previous year.

Gaol Expenditures.

TABLE No. 1.

Showing the cost of maintaining the Common Gaols during the past thirty-eight years, under the heading of rations, clothing, fuel, salaries and wages, and repairs.

Year.	Total number of prisoners in custody each year.	Cost of rations, clothing, fuel, etc., each year.	Cost of salaries and wages of gaol officials each year.	Cost of repairs.	Total gaol expenditure.
		$ c	$ c.	$ c.	$ c.
1879	11,229	58,856 24	63,914 40	5,583 44	122,355 08
1880	11,300	49,037 14	64,084 34	3,504 96	116,626 44
1881	9,229	45,001 05	63,502 00	3,410 12	111,915 15
1882	9,620	44,768 92	63,794 30	4,665 52	113,228 75
1883	9,880	44,783 50	64,935 96	4,706 20	114,425 66
1884	12,081	61,909 89	68,446 88	7,125 50	127,482 27
1885	11,426	54,321 35	70,344 96	5,081 55	129,747 86
1886	10,645	53,300 43	71,690 76	8,753 07	133,744 26
1887	11,017	48,650 27	71,291 58	6,146 71	126,088 56
1888	12,454	53,961 25	73,633 11	6,509 13	134,143 49
1889	12,531	55,002 89	77,677 84	3,313 20	135,983 93
1890	11,810	51,446 99	79,394 49	9,171 01	140,012 49
1891	10,423	58,110 73	79,741 59	12,183 02	150,035 34
1892	9,011	51,505 57	75,564 83	4,635 65	135,706 05
1893	8,619	49,762 40	79,639 81	8,083 50	137,485 71
1894	9,450	45,115 58	79,790 80	6,728 04	131,634 42
1895	9,380	50,591 40	79,677 17	6,304 58	136,573 15
1896	9,058	49,107 73	80,940 04	6,778 50	135,826 27
1897	8,884	51,066 56	80,863 60	10,248 93	142,179 09
1898	8,256	50,412 91	80,915 05	5,982 56	137,310 52
1899	8,203	50,362 88	82,047 98	4,206 66	136,617 50
1900	8,604	50,353 75	82,144 05	4,944 21	137,442 10
1901	8,546	48,977 86	82,305 15	6,065 44	137,348 45
1902	8,280	49,125 35	85,350 04	6,515 40	140,990 79
1903	9,261	57,252 84	86,081 95	7,122 23	150,457 02
1904	10,146	59,916 13	89,164 98	5,413 09	154,494 20
1905	11,035	64,948 78	91,232 56	7,087 09	163,268 43
1906	10,810	59,874 67	91,663 85	6,635 49	158,174 01
1907	11,804	61,995 01	95,321 24	7,536 14	164,852 39
1908	13,083	68,468 72	98,651 71	8,708 79	175,829 20
1909	13,535	74,557 65	103,141 14	6,877 58	184,576 37
1910	13,687	66,042 87	102,649 54	10,574 71	181,851 05
1911	15,275	70,077 87	106,690 02	7,759 74	187,626 11
1912	16,985	83,708 63	114,462 75	5,765 38	203,936 76
1913	19,250	77,828 15	116,704 08	8,542 59	203,074 82
1914	22,777	87,825 99	124,516 23	9,128 51	221,470 73
1915	20,337	87,403 52	120,742 08	6,840 72	214,986 32
1916	16,100	69,918 14	119,727 46	5,646 14	195,291 74

A summary is given below showing the days' stay respectively of those prisoners whose maintenance was chargeable to the Province and of those who were a charge on the Municipalities :—

		Days' stay.
6,155	Criminal prisoners remained in gaol	108,749
9,945	Municipal " " "	123,302
16,100	Prisoners in all " "	232,051

TABLE No. 2.

Showing the total number of prisoners who were in the several gaols of the Province on the evening of the 30th September, 1916, and the nature of their imprisonment; also number of cells in each gaol.

Name of gaol.	Classification.				Nature of Imprisonment.						Total number of persons who remained in custody 30th September, 1916.	Total number of cells.
	Men.	Women.	Boys under 16 years.	Girls under 16 years.	Waiting trial.	Under sentence for periods of 2 months and under.	Under sentence for periods over 2 months.	In default of sureties to keep the peace.	Insane, idiotic or imbecile persons.	Otherwise detained.		
Barrie	10	1	....	....	3	.....	2	.....	2	4	11	23
Belleville	11	...	....	....	1	5	4	.....	1	....	11	38
Brantford	2	...	....	....	....	.....	2	.....	.....	....	2	24
Brampton	...	...	....	....	....	.....	.....	.....	.....	....	.....	25
Brockville	5	...	....	....	2	1	2	.....	.....	....	5	34
Bracebridge	2	...	....	....	....	.....	2	.....	.....	....	2	15
Cayuga	...	...	....	....	....	.....	.....	.....	.....	....	.....	14
Cornwall	1	2	....	....	....	1	2	.....	.....	....	3	17
Cobourg	2	...	....	....	....	.....	2	.....	.....	....	2	24
Chatham	8	5	....	....	2	2	9	.....	.....	....	13	37
Fort Frances	10	2	....	....	2	.....	1	.....	2	7	12	12
Goderich	4	...	....	....	....	1	2	.....	1	....	4	12
Guelph	2	...	....	....	....	2	.....	.....	.....	....	2	18
Gore Bay	2	1	....	....	....	1	1	.....	1	....	3	12
Hamilton	10	5	....	....	4	5	6	.....	.....	....	15	60
Kingston	22	2	....	....	2	2	20	.....	.....	....	24	49
Kitchener	5	1	....	....	....	2	3	.....	.....	1	6	20
Kenora	2	...	....	....	2	.....	.....	.....	.....	....	2	14
London	11	1	....	....	3	7	2	.....	.....	....	12	57
Lindsay	1	1	....	....	1	.....	.....	.....	.....	1	2	24
L'Orignal	1	...	....	....	1	.....	.....	.....	.....	....	1	18
Milton	2	...	....	....	1	1	.....	.....	.....	....	2	22
Napanee	1	...	....	....	....	1	.....	.....	.....	....	1	18
North Bay	16	3	....	....	5	8	6	.....	.....	....	19	19
Ottawa	33	10	....	....	9	8	26	.....	.....	....	43	93
Owen Sound	6	2	....	....	....	.....	7	.....	1	....	8	32
Orangeville	7	...	....	....	1	.....	5	.....	1	....	7	22
Perth	4	1	....	....	....	1	3	.....	1	....	5	18
Picton	3	...	....	....	....	2	1	.....	.....	....	3	18
Pembroke	7	1	....	....	....	1	7	.....	.....	....	8	24
Peterborough	7	2	....	....	2	.....	7	.....	.....	....	9	18
Port Arthur	13	9	....	....	1	.....	16	.....	5	....	22	40
Parry Sound	1	1	....	....	1	.....	.....	.....	1	....	2	24
Simcoe	3	...	....	....	1	1	1	.....	.....	....	3	18
St. Catharines	13	2	....	....	6	6	3	.....	.....	....	15	38
Sarnia	11	3	....	....	2	6	5	.....	1	....	14	13
Stratford	3	2	1	....	3	.....	3	.....	.....	....	6	30
Sandwich	15	1	....	....	2	5	9	.....	.....	....	16	58
St. Thomas	3	1	....	....	....	1	3	.....	.....	....	4	16
Sault Ste. Marie	15	2	....	....	....	6	10	.....	1	....	17	34
Sudbury	11	...	....	....	1	3	6	.....	1	....	11	22
Toronto	64	15	....	....	27	32	20	.....	.....	....	79	270
Walkerton	2	1	....	....	....	1	2	.....	.....	....	3	24
Woodstock	9	1	....	....	1	1	8	.....	.....	....	10	32
Welland	6	...	....	....	2	2	2	.....	.....	....	6	50
Whitby	3	1	....	....	....	2	.....	.....	2	....	4	28
Lockups:												
Atikokan	...	...	....	....	....	.....	.....	.....	.....	....	.....	3
Byng Inlet	...	...	....	....	....	.....	.....	.....	.....	....	.....	7
Cobalt	...	...	....	....	....	.....	.....	.....	.....	....	.....	6
Mine Centre	1	...	....	....	1	.....	.....	.....	.....	....	1	3
Totals	370	79	1	....	89	117	210	.....	21	13	450	1,547

TABLE

Showing the number of persons committed, the number over and under sixteen years of age, the sound mind, number acquitted on trial, number discharged without trial, number

Name of gaol.	Total number committed during the year.			Number under 16 years of age.			Number over 16 years of age.			For the first time.	For the second time.
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.		
Barrie	193	11	204	1	1	2	192	10	202	159	15
Belleville	284	38	322	.....	.....	.....	284	38	322	269	18
Brantford	326	11	337	.....	.....	.....	326	11	337	201	32
Brampton	27	2	29	1	.....	1	26	2	28	22	4
Brockville	176	23	199	5	2	7	171	21	192	121	43
Bracebridge	20	2	22	.....	1	1	20	1	21	16	3
Cayuga	60	2	62	1	.....	1	59	2	61	51	5
Cornwall	66	7	73	8	1	9	58	6	64	40	18
Cobourg	144	4	148	5	.....	5	139	4	143	93	33
Chatham	208	13	221	12	2	14	196	11	207	143	40
Fort Frances	140	4	144	1	.....	1	139	4	143	134	6
Goderich	50	1	51	2	.....	2	48	1	49	29	10
Guelph	67	5	72	.....	.....	.....	67	5	72	32	35
Gore Bay	15	4	19	.....	.....	.....	15	4	19	12	3
Hamilton	1,544	134	1,678	2	.....	2	1,542	134	1,676	851	204
Kingston	210	18	228	1	1	2	209	17	226	181	24
Kitchener	149	12	161	2	.....	2	147	12	159	111	26
Kenora	22	2	24	.....	.....	.....	22	2	24	21	2
London	749	87	836	6	.....	6	743	87	830	414	158
Lindsay	28	3	31	2	.....	2	26	3	29	28	2
L'Orignal	27	1	28	3	.....	3	24	1	25	26	2
Milton	183	2	185	.....	.....	.....	183	2	185	164	2
Napanee	53	4	57	1	.....	1	52	4	56	40	6
North Bay	152	19	171	.....	.....	.....	152	19	171	149	17
Ottawa	703	160	863	3	.....	3	700	160	860	789	42
Owen Sound	76	8	84	.....	.....	.....	76	8	84	42	17
Orangeville	27	3	30	.....	.....	.....	27	3	30	29	1
Perth	72	5	77	6	.....	6	66	5	71	69	3
Picton	95	1	96	.....	.....	.....	95	1	96	86	2
Pembroke	110	3	113	.....	.....	.....	110	3	113	106	4
Peterborough	223	44	267	1	.....	1	223	44	266	170	44
Port Arthur	329	24	353	.....	.....	.....	329	24	353	341	8
Parry Sound	849	12	861	.....	.....	.....	849	12	861	753	77
Simcoe	103	3	106	1	.....	1	102	3	105	52	10
St. Catharines	238	5	243	.....	.....	.....	238	5	243	147	34
Sarnia	233	12	245	5	.....	5	228	12	240	155	49
Stratford	104	5	109	1	.....	1	103	5	108	78	22
Sandwich	177	15	192	.....	.....	.....	177	15	192	138	5
St. Thomas	98	18	116	1	.....	1	97	18	115	79	19
Sault Ste. Marie	207	29	236	.....	.....	.....	207	29	236	198	25
Sudbury	1,117	47	1,164	1	3	4	1,116	44	1,160	940	99
Toronto	4,239	673	4,912	.....	.....	.....	4,239	673	4,912	4,334	388
Walkerton	39	3	42	2	.....	2	37	3	40	33	6
Woodstock	250	5	255	2	.....	2	248	5	253	143	48
Welland	220	11	231	.....	.....	.....	220	11	231	185	26
Whitby	83	1	84	3	.....	3	80	1	81	57	18
Lockups :											
Atikokan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Byng Inlet	9	.....	9	.....	.....	.....	9	.....	9	9	.....
Cobalt	81	19	100	1	1	2	80	18	98	100	.....
Mine Centre	10	.....	10	.....	.....	.....	10	.....	10	10	.....
Totals	14,585	1,515	16,100	80	12	92	14,506	1,502	16,008	12,350	1,655

No. 3.

number of re-committals, the number for want of sureties to keep the peace, number of unwaiting trial, number sentenced, and number committed under civil process.

For the third time.	For more than the third time.	For want of sureties to keep the peace.	Witnesses.	Lunatics and idiots.	Fraudulent debtors.	Under civil process.	Acquitted on trial and discharged.	Discharged without trial.	Discharged under suspended sentence.	Died before trial.	Waiting trial.	Sentenced for any period.
10	20	.....	.....	9	.....	1	13	2	10	.....	3	166
10	25	1	.....	.....	.....	.....	169	1	6	.....	1	144
14	90	.....	.....	6	.....	.....	152	.....	.....	.....	.....	179
2	1	.....	.....	2	.....	.....	11	2	8	.....	.....	6
7	28	.....	.....	1	.....	.....	24	3	13	17	2	139
2	1	.....	.....	3	.....	.....	3	3	1	.....	.....	12
1	5	.....	.....	3	.....	.....	12	.....	7	.....	.....	40
4	11	.....	.....	.....	1	.....	10	.....	10	.....	.....	52
11	11	.....	.....	2	.....	.....	13	.....	11	.....	.....	122
6	32	.....	.....	3	.....	.....	73	.....	.....	.....	2	143
1	3	.....	4	4	.....	.....	31	10	8	.....	9	78
5	7	.....	.....	8	.....	.....	14	1	2	.....	.....	26
3	2	.....	.....	.....	.....	.....	.....	11	8	.....	.....	53
2	2	.....	.....	2	.....	.....	2	.....	.....	.....	.....	15
96	527	23	.....	42	.....	.....	18	368	15	.....	4	1,208
13	10	.....	.....	2	.....	.....	3	24	6	.....	2	191
14	10	.....	.....	2	.....	1	4	41	12	.....	.....	101
.....	1	.....	.....	1	.....	.....	1	.....	2	.....	2	18
50	214	.....	3	16	1	.....	305	.....	5	1	3	502
.....	1	.....	.....	5	.....	.....	7	.....	5	.....	2	12
.....	.....	.....	.....	2	.....	.....	1	.....	.....	.....	1	24
4	15	.....	.....	1	.....	21	3	112	5	.....	1	42
3	8	.....	.....	.....	1	.....	8	.....	3	.....	.....	45
2	3	.....	.....	10	3	.....	17	.....	2	.....	.....	139
23	9	.....	.....	.....	6	.....	428	.....	.....	.....	9	420
7	18	.....	.....	5	.....	.....	13	.....	2	.....	.....	64
.....	.....	.....	.....	2	.....	.....	3	1	1	.....	1	22
2	3	.....	.....	3	.....	.....	10	.....	9	.....	1	54
1	7	.....	.....	.....	.....	.....	.....	84	.....	.....	.....	12
.....	3	.....	.....	1	.....	.....	4	.....	2	.....	.....	106
15	38	1	.....	10	.....	.....	48	91	7	1	2	107
2	2	.....	.....	15	.....	1	38	3	6	.....	.....	290
21	10	.....	1	6	.....	.....	112	20	20	.....	1	701
18	26	.....	.....	1	.....	.....	26	.....	10	.....	1	68
16	46	.....	.....	1	.....	.....	46	.....	12	.....	6	178
19	22	.....	.....	3	1	.....	4	54	6	.....	2	175
9	.....	.....	.....	1	.....	.....	3	30	7	.....	3	65
26	23	.....	.....	1	1	.....	62	.....	32	.....	1	95
11	7	.....	.....	.....	3	.....	55	1	2	.....	.....	55
8	5	.....	4	6	.....	.....	12	42	1	.....	.....	171
74	51	.....	13	7	.....	.....	132	6	477	.....	1	528
106	84	.....	9	1	2	.....	1,651	19	842	.....	29	2,359
.....	3	.....	.....	8	.....	.....	4	7	2	.....	.....	21
17	47	.....	.....	5	.....	.....	43	.....	56	.....	1	150
7	13	.....	.....	1	2	.....	.....	71	.....	.....	1	156
5	4	.....	.....	5	.....	.....	20	.....	7	.....	.....	52
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	9	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	26	5	11	.....	.....	58
.....	.....	.....	.....	.....	.....	.....	8	1	1	.....	.....	.....
647	1,448	25	34	206	21	33	3,642	1,013	1,652	19	91	9,364

TABLE

Showing the offences for which prisoners were sentenced

Name of gaol.	Abortion.	Abusive and obscene language.	Arson.	Assault.	Assault, felonious.	Attempted suicide.	Abduction.	Bigamy.	Breaches of the peace.	Breaches of By-laws.	Burglary.
Barrie				2						3	
Belleville		3		2	2			1		3	
Brantford		3		7							
Brampton											
Brockville		1		1	8			3			1
Bracebridge				1							
Cayuga				3							
Cornwall		2	1	2	5						2
Cobourg		5		3				1			
Chatham			1	9	4						
Fort Frances					4					2	
Goderich											
Guelph											1
Gore Bay				1							
Hamilton				33	1			3			9
Kingston				1							
Kitchener				5	4						
Kenora				1							
London		3	1	11				3		3	
Lindsay											
L'Orignal				2							
Milton				2	1						1
Napanee				1					4	7	
North Bay				10	2						
Ottawa		1		25	1			5	13	18	2
Owen Sound											
Orangeville										8	
Perth								2			5
Picton											
Pembroke				5							
Peterborough				4	1						
Port Arthur				20	8						1
Parry Sound				32	1		1	1			6
Simcoe		1		2				1		1	
St. Catharines			2	7	3			2			1
Sarnia		2	3	6	1						3
Stratford		1		3							
Sandwich			1	11	1			2			9
St. Thomas				2	3						
Sault Ste. Marie		1		19	1	1			2		
Sudbury	1			34							3
Toronto				15	37			9		5	2
Walkerton				2							
Woodstock		1		6				1			
Welland				3	4						9
Whitby		1		1			2	1			
Lock-ups:											
Atikokan											
Byng Inlet											
Cobalt				5							
Mine Centre											
Totals	1	25	9	299	92	1	3	35	19	50	55

No. 4.

during the year ending September 30th, 1916.

Contempt of Court.	Carrying unlawful weapons.	Counterfeiting and passing counterfeit money.	Cruelty to animals.	Cutting, wounding and attempting same.	Deserting employment	Destroying and injuring property.	Drunk and disorderly.	Embezzlement	Escaping from and obstructing constables	Escaping from prison.	Forgery.	Fraud or obtaining money under false pretences.
2	1	.....	.....	.....	.....	.....	43	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	6	.....	49	.....	.....	2	.....	2
.....	1	.....	2	.....	2	.....	116	.....	2	.....	.....	2
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	55	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	1	.....	3	.....	5	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	7	.....	6	.....	.....	.....	1	1
.....	.....	.....	.....	.....	.....	2	55	.....	.....	.....	1	2
1	.....	.....	.....	.....	.....	.....	70	.....	.....	.....	.....	.....
1	.....	.....	.....	1	.....	.....	40	.....	1	.....	.....	1
2	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	1
2	.....	.....	.....	.....	5	.....	2	.....	1	24	.....	.....
.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	1
.....	2	.....	2	.....	.....	6	726	.....	6	.....	8	28
.....	.....	.....	.....	.....	26	.....	98	.....	.....	.....	3	.....
14	.....	.....	.....	.....	.....	1	29	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	7	.....	.....	.....	.....	.....
2	.....	.....	.....	.....	.....	5	287	.....	.....	.....	.....	1
.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	2	.....	8	.....	1	1	.....	.....
.....	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	1
2	.....	.....	.....	1	2	.....	19	.....	.....	.....	1	4
.....	1	.....	3	3	.....	3	105	.....	1	.....	4	7
.....	.....	.....	.....	.....	.....	.....	10	.....	1	.....	.....	1
1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	.....	.....	.....	.....	.....	.....	11	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	1
3	.....	.....	1	.....	.....	.....	27	.....	.....	.....	1	2
2	.....	.....	1	.....	.....	.....	37	.....	.....	.....	.....	.....
.....	1	.....	.....	.....	.....	.....	111	.....	.....	.....	.....	2
.....	.....	.....	.....	.....	5	.....	455	.....	.....	.....	.....	12
1	.....	.....	.....	.....	.....	.....	17	.....	.....	.....	.....	.....
1	.....	.....	1	1	18	1	69	.....	4	.....	.....	.....
.....	1	.....	.....	.....	3	.....	116	.....	1	1	.....	.....
1	.....	.....	.....	.....	.....	.....	21	.....	.....	.....	.....	1
.....	1	.....	1	.....	3	.....	21	.....	6	1	2	6
3	2	.....	.....	.....	.....	.....	7	.....	.....	.....	.....	1
.....	2	.....	.....	.....	10	.....	31	.....	2	.....	1	2
.....	6	.....	.....	.....	.....	3	294	.....	1	15	3	18
.....	4	.....	3	15	.....	3	822	.....	19	13	5	51
.....	.....	.....	.....	.....	4	3	4	.....	.....	.....	.....	1
1	.....	.....	.....	.....	.....	.....	56	.....	.....	.....	2	.....
10	.....	.....	.....	.....	12	.....	32	.....	.....	3	2	2
1	.....	.....	.....	.....	.....	.....	6	.....	1	4	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	10	.....	.....	1	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
51	22	.....	15	21	108	27	3,911	.....	47	65	36	152

TABLE

Showing offences for which prisoners were sentenced

Name of goal.	Gambling.	Giving liquor to Indians.	Horse, cattle and sheep stealing.	House breaking and robbery.	Incendiarism.	Indecent assault and exposure.	Inmates and frequenters of houses of ill-fame.	Keeping house of ill-fame.	Larceny.	Manslaughter.	Misdemeanour	Murder.	Perjury.
Barrie	....	1	2	.....	....	3	.....	1	29	....	....	....	....
Belleville	....	....	1	6	....	.....	.....	1	8	....	7	....	1
Brantford	....	5	.....	.....	....	1	.....	....	5	....	2	....	....
Brampton	....	....	.....	.....	....	.....	.....	....	1	....	....	....	....
Brockville	....	....	1	.....	....	.....	4	3	4	....	1	....	....
Bracebridge	....	....	2	4	....	.....	.....	....	.....	....	....	....	....
Cayuga	....	....	.....	.....	....	.....	.....	....	2	....	....	....	....
Cornwall	....	....	3	1	....	2	.....	....	8	....	....	....	1
Cobourg	....	....	1	.....	....	.....	.....	....	8	....	....	....	....
Chatham	....	2	.....	6	....	.....	 1	3	20	....	....	....	....
Fort Frances	....	14	.....	1	....	1	.....	....	3	....	....	....	....
Goderich	....	....	.....	.....	....	.....	.....	....	.....	....	....	....	1
Guelph	....	....	1	2	....	1	.....	....	9	....	....	1	1
Gore Bay	....	1	1	.....	....	.....	.....	....	3	....	....	....	....
Hamilton	2	....	1	10	....	8	2	11	89	....	....	....	....
Kingston	....	....	.....	.....	....	.....	2	2	11	....	....	....	....
Kitchener	....	....	2	1	....	4	.....	....	9	....	....	....	1
Kenora	....	....	.....	1	....	.....	.....	....	2	....	....	....	....
London	1	9	1	1	....	1	2	2	39	....	....	....	....
Lindsay	....	....	.....	1	....	.....	.....	....	1	....	....	....	....
L'Orignal	....	....	.....	.....	....	1	.....	1	.....	....	....	....	....
Milton	....	....	.....	.....	....	2	.....	....	4	....	....	....	....
Napanee	....	....	1	.....	....	1	.....	....	6	....	....	....	....
North Bay	1	2	.....	.....	....	1	4	....	21	....	....	....	....
Ottawa	....	....	1	13	....	3	5	16	65	....	....	....	....
Owen Sound	5	....	1	3	....	1	1	3	6	....	....	....	....
Orangeville	....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Perth	....	....	.....	3	....	.....	.....	....	.....	....	....	....	2
Picton	....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Pembroke	....	....	.....	.....	....	.....	.....	....	11	....	....	1	....
Peterborough	....	1	.....	1	....	.....	.....	1	8	....	....	....	....
Port Arthur	....	8	.....	2	....	.....	1	3	28	....	....	....	....
Parry Sound	....	10	.....	1	....	3	2	2	14	....	7	1	....
Simcoe	....	....	.....	.....	....	.....	.....	....	3	....	....	....	....
St. Catharines	1	....	.....	.....	....	1	2	2	14	....	6	....	....
Sarnia	....	7	.....	3	....	.....	1	1	9	....	....	....	....
Stratford	4	....	.....	.....	....	1	2	1	7	....	....	....	....
Sandwich	....	....	.....	.....	....	2	1	1	4	....	....	....	1
St. Thomas	....	....	.....	1	....	.....	5	2	8	....	2	....	1
Sault Ste. Marie	....	4	.....	.....	....	.....	5	3	16	....	....	....	2
Sudbury	4	....	.....	2	....	.....	10	6	34	....	....	1	....
Toronto	31	....	.....	51	....	35	118	125	358	1	....	....	5
Walkerton	....	....	.....	.....	....	.....	.....	....	1	....	....	....	....
Woodstock	....	....	.....	.....	....	2	1	1	16	....	....	....	....
Welland	....	....	.....	.....	....	.....	.....	....	.....	....	....	1	....
Whitby	....	....	.....	3	....	.....	.....	....	.....	....	....	....	....
Lock-ups :													
Atikokan	....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Byng Inlet	....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Cobalt	12	1	.....	.....	....	1	.....	1	6	....	....	....	....
Mine Centre	....	....	.....	.....	....	.....	.....	....	.....	....	....	....	....
Totals	61	65	19	117	....	75	169	192	890	1	25	5	16

No. 4—Concluded.

during the year ended September 30th, 1916.

Prostitution.	Rape and assault with intent.	Refusing bail.	Receiving stolen goods.	Seduction.	Selling liquor without a license.	Shooting with intent.	Stabbing.	Threatening and seditious language.	Trespass.	Unlawful shooting.	Vagrancy.	Other offences not enumerated.	Totals.
1	1	.....	.....	.....	11	1	.....	1	1	.....	17	45	166
2	1	.....	.....	.....	11	.....	.....	2	13	.....	21	.....	144
.....	.....	.....	.....	.....	7	.....	.....	.....	.....	.....	10	14	179
.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	1	.....	6
7	.....	.....	.....	1	3	.....	.....	.....	.....	.....	8	38	139
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	.....	12
.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	21	4	40
1	.....	.....	.....	.....	4	.....	.....	.....	1	.....	3	1	52
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	38	5	122
.....	.....	.....	.....	.....	1	.....	1	.....	.....	.....	7	17	143
.....	.....	.....	.....	.....	2	.....	.....	.....	1	4	.....	2	78
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	.....	26
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	2	53
2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	15
.....	.....	.....	3	1	24	1	.....	.....	11	.....	58	163	1,208
.....	.....	.....	.....	1	10	1	.....	.....	.....	.....	17	19	191
.....	.....	.....	2	.....	.....	.....	.....	.....	1	1	14	12	101
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	3	18
.....	.....	.....	.....	1	2	.....	.....	.....	13	.....	21	93	502
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	5	12
.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	4	13	24
.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	18	1	42
.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	5	.....	45
2	1	.....	1	.....	29	.....	.....	.....	.....	2	24	10	139
.....	.....	.....	.....	2	7	.....	.....	.....	.....	.....	53	63	420
.....	.....	.....	.....	.....	19	.....	.....	.....	.....	.....	8	5	64
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12	1	22
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	19	10	54
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	6	12
.....	1	.....	.....	.....	1	.....	.....	.....	14	.....	11	28	106
1	1	1	.....	1	3	.....	.....	.....	5	.....	28	11	107
.....	2	.....	4	.....	7	.....	.....	2	14	1	52	23	290
4	.....	.....	.....	.....	6	1	.....	1	9	.....	75	52	701
.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	5	31	68
.....	.....	.....	1	.....	14	.....	.....	1	2	.....	13	11	178
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	7	175
.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	3	19	65
.....	6	.....	8	.....	.....	1	.....	.....	.....	.....	4	2	95
1	.....	.....	.....	.....	8	.....	.....	.....	2	.....	1	6	55
3	.....	.....	1	.....	24	.....	.....	1	.....	.....	26	14	171
2	.....	.....	1	.....	19	1	.....	.....	12	.....	22	36	528
.....	.....	.....	9	3	51	1	.....	1	38	.....	363	166	2,359
.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	4	1	21
1	.....	.....	.....	1	2	.....	.....	.....	.....	1	23	35	150
.....	.....	.....	3	.....	14	.....	.....	.....	9	.....	34	18	156
.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	7	24	52
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	.....	.....	3	.....	8	.....	.....	.....	.....	.....	2	6	58
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
29	13	1	37	12	301	8	1	9	149	9	1,094	1,022	9,364

TABLE No. 5.

Showing the total number of prisoners, male and female, sentenced under each offence, during the year ending September 30th, 1916.

Offences.	Male.	Female.	Total
Abortion	1	.....	1
Abusive and obscene language	24	1	25
Arson	9	.....	9
Assault	294	5	299
Assault, felonious	92	.....	92
Attempted suicide	1	.....	1
Abduction	3	.....	3
Bigamy	26	9	35
Breaches of the peace	17	2	19
Breaches of by-laws	47	3	50
Burglary	55	.....	55
Contempt of court	51	.....	51
Carrying unlawful weapons	21	1	22
Counterfeiting and passing counterfeit money	.....	.....	.....
Cruelty to animals	15	.....	15
Cutting, wounding and attempting same	20	1	21
Deserting employment	107	1	108
Destroying and injuring property	26	1	27
Drunk and disorderly	3,682	229	3,911
Embezzlement	.....	.....	.....
Escaping from or obstructing constables	44	3	47
Escaping from prison	63	2	65
Forgery	34	2	36
Fraud or obtaining money or goods under false pretences	149	3	152
Gambling	61	.....	61
Giving liquor to Indians	63	2	65
Horse, cattle and sheep stealing	19	.....	19
Housebreaking and robbery	117	.....	117
Incendiarism	.....	.....	.....
Indecent assault and exposure	75	.....	75
Inmates and frequenters of houses of ill-fame	96	73	169
Keeping houses of ill-fame	69	123	192
Larceny	808	82	890
Manslaughter	.....	1	1
Misdemeanour	24	1	25
Murder	5	.....	5
Perjury	15	1	16
Prostitution	.....	29	29
Rape and assault with intent	13	.....	13
Refusing bail	1	.....	1
Receiving stolen property	35	2	37
Seduction	12	.....	12
Selling liquor without license	265	36	301
Shooting with intent	8	.....	8
Stabbing	1	.....	1
Threatening and seditious language	9	.....	9
Trespass	149	.....	149
Unlawful shooting	9	.....	9
Vagrancy	907	187	1,094
Other offences not enumerated	993	29	1,022
Totals	8,535	829	9,364

TABLE No. 6.

Showing the social status and habits of the prisoners committed during the year ending September 30th, 1916.

Name of gaol.	Married.	Unmarried.	Neither read nor write.	Temperate	Intemperate.	Total committed to gaol.
Barrie	80	124	37	110	94	204
Belleville	108	214	55	166	156	322
Brantford	126	211	31	59	278	337
Brampton	12	17	4	5	24	29
Brockville	82	117	.....	92	107	199
Bracebridge	7	15	5	21	1	22
Cayuga	20	42	4	11	51	62
Cornwall	31	42	36	24	49	73
Cobourg	26	122	15	41	107	148
Chatham	75	146	45	77	144	221
Fort Frances	73	71	36	30	114	144
Goderich	19	32	1	34	17	51
Guelph	22	50	8	37	35	72
Gore Bay	12	7	8	11	8	19
Hamilton	647	1,031	244	213	1,465	1,678
Kingston	72	156	25	27	201	228
Kitchener	79	82	10	100	61	161
Kenora	14	10	8	8	16	24
London	301	535	32	314	522	836
Lindsay	13	18	3	17	14	31
L'Orignal	9	19	8	16	12	28
Milton	15	170	5	29	156	185
Napanee	26	31	9	22	35	57
North Bay	66	105	23	79	92	171
Ottawa	387	476	195	316	547	863
Owen Sound	29	55	16	25	59	84
Orangeville	19	11	7	13	17	30
Perth	16	61	17	29	48	77
Picton	31	65	9	15	81	96
Pembroke	26	87	28	45	68	113
Peterborough	123	144	26	104	163	267
Port Arthur	97	256	48	71	282	353
Parry Sound	197	664	187	70	791	861
Simcoe	45	61	14	24	82	106
St. Catharines	65	178	47	77	166	243
Sarnia	65	180	38	33	212	245
Stratford	48	61	20	37	72	109
Sandwich	97	95	21	64	128	192
St. Thomas	65	51	15	59	57	116
Sault Ste. Marie	85	151	60	60	176	236
Sudbury	241	923	71	28	1,136	1,164
Toronto	1,966	2,946	423	1,090	3,822	4,912
Walkerton	23	19	4	28	14	42
Woodstock	75	180	16	152	103	255
Welland	127	104	48	108	123	231
Whitby	32	52	20	37	47	84
Lock-ups:						
Atikokan	.....	.....	.....	.....	.....	.....
Byng Inlet	1	8	.....	.....	9	9
Cobalt	54	46	16	42	58	100
Mine Centre	.....	10	.....	.....	10	10
Totals	5,849	10,251	1,998	4,066	12,034	16,100

TABLE

Showing the number of prisoners upon whom sentences were passed, the nature of such
Court during the year ending

Name of gaol.	Total number of prisoners sentenced during the year.			Where sentenced to.					
	Male.	Female.	Total.	To gaol and afterwards transferred to the Central Prison.	To Central Prison direct.	To gaol and afterwards to Female Reformatory.	To Female Reformatory direct.	To Provincial Penitentiary.	To Industrial Schools.
Barrie	160	6	166	9	57	.....	4	1	.....
Belleville	135	9	144	2	24	.....	6	3	.....
Brantford	176	3	179	.....	17	.....	.....	.....	.....
Brampton	5	1	6	.....	2	.....	1	.....	.....
Brockville	119	20	139	.....	9	.....	9	.....	2
Bracebridge	12	.....	12	.....	2	.....	.....	.....	.....
Cayuga	39	1	40	.....	.....	1	.....	1	.....
Cornwall	47	5	52	2	13	.....	2	.....	4
Cobourg	119	3	122	4	2	.....	1	.....	1
Chatham	133	10	143	1	24	.....	1	3	6
Fort Frances	77	1	78	.....	1	1	1	1	.....
Goderich	26	.....	26	.....	.....	.....	.....	.....	1
Guelph	51	2	53	5	14	.....	.....	16	.....
Gore Bay	12	3	15	.....	1	.....	1	.....	.....
Hamilton	1,130	78	1,208	82	78	.....	11	21	.....
Kingston	178	13	191	16	6	2	.....	3	.....
Kitchener	98	3	101	1	17	.....	2	4	.....
Kenora	17	1	18	.....	1	.....	1	1	.....
London	479	23	502	15	30	.....	7	5	.....
Lindsay	12	.....	12	.....	6	.....	.....	.....	.....
L'Orignal	23	1	24	.....	1	.....	.....	.....	.....
Milton	42	.....	42	.....	.....	.....	.....	1	.....
Napanee	43	2	45	.....	1	.....	2	.....	.....
North Bay	124	15	139	.....	43	18	.....	5	3
Ottawa	338	82	420	.....	20	25	12	16	.....
Owen Sound	60	4	64	.....	10	.....	2	.....	.....
Orangeville	20	2	22	.....	.....	.....	.....	.....	.....
Perth	51	3	54	.....	.....	.....	1	1	3
Picton	12	.....	12	.....	.....	.....	.....	.....	.....
Pembroke	103	3	106	2	.....	.....	.....	7	.....
Peterborough	89	18	107	1	15	.....	17	1	.....
Port Arthur	272	18	290	7	7	.....	1	7	.....
Parry Sound	696	5	701	.....	5	.....	5	5	.....
Simcoe	67	1	68	1	3	.....	.....	1	.....
St. Catharines	173	5	178	25	23	.....	1	1	.....
Sarnia	168	7	175	.....	27	.....	3	3	3
Stratford	64	1	65	1	5	.....	.....	.....	.....
Sandwich	87	8	95	1	20	.....	1	9	.....
St. Thomas	46	9	55	4	19	.....	3	3	.....
Sault Ste. Marie	147	24	171	.....	36	.....	15	5	.....
Sudbury	501	27	528	.....	72	.....	11	10	.....
Toronto	1,953	406	2,359	222	69	.....	39	44	.....
Walkerton	21	.....	21	.....	.....	.....	.....	.....	.....
Woodstock	147	3	150	6	7	.....	2	8	1
Welland	150	6	156	48	.....	3	.....	2	1
Whitby	52	.....	52	5	7	.....	.....	7	.....
Lock-ups :									
Atikokan	.....	.....	.....	.....	.....	.....	.....	.....	.....
Byng Inlet	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cobalt	50	8	58	.....	.....	.....	1	.....	.....
Mine Centre	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	8,524	840	9,364	460	694	50	163	195	25

No. 7.

sentences, and the disposal of those who elected to be tried at the County Judge's Criminal September 30th, 1916.

Died while undergoing sentence.	To gaol and there detained until expiration of sentence or payment of fine.	Capital and corporal sentences.			County Judge's criminal court.		
		Number of prisoners sentenced to death and executed.	Number of prisoners sentenced to death and commuted to imprisonment.	Number of prisoners sentenced to corporal punishment with imprisonment.	Acquitted on trial and discharged from custody.	Found guilty and sentenced.	Total number who elected to be tried.
.....	95	.....	.....	.....	4	7	11
.....	109	.....	.....	.....	10	19	29
.....	162	.....	.....	.....	8	4	12
.....	3	.....	.....	.....	10	7	17
.....	119	.....	.....	.....	8	8	16
1	9	.....	.....	.....	3	6	9
.....	38	.....	.....	.....	3	6	9
.....	31	.....	.....	.....	.....	10	10
.....	114	.....	.....	.....	4	3	7
1	107	.....	.....	.....	5	11	16
.....	74	.....	.....	.....	5	1	6
.....	25	.....	.....	.....	8	1	9
1	17	.....	.....	.....	.....	21	21
.....	13	.....	.....	.....	.....	.....	.....
.....	1,016	.....	.....	2	18	72	90
.....	164	.....	.....	.....	4	6	10
.....	77	.....	.....	.....	4	14	18
.....	15	.....	.....	.....	.....	.....	.....
.....	445	.....	.....	.....	5	8	13
.....	6	.....	.....	.....	1	.....	1
.....	23	.....	.....	.....	1	21	22
1	40	.....	.....	.....	3	42	45
.....	42	.....	.....	.....	7	1	8
3	67	.....	.....	.....	8	3	11
.....	347	.....	.....	.....	39	6	45
.....	52	.....	.....	.....	3	11	14
.....	22	.....	.....	.....	4	.....	4
.....	49	.....	.....	.....	5	16	21
.....	12	.....	.....	.....	1	12	13
.....	97	.....	.....	1	.....	2	2
.....	73	.....	.....	.....	1	3	4
.....	268	.....	.....	.....	1	6	7
2	684	1	.....	.....	15	1	16
.....	63	1	.....	.....	4	5	9
.....	128	.....	.....	.....	4	8	12
.....	139	.....	.....	.....	4	10	14
.....	59	.....	.....	.....	.....	4	4
.....	64	.....	.....	.....	10	7	17
.....	26	.....	.....	.....	5	6	11
.....	115	.....	.....	.....	1	7	8
1	434	1	.....	.....	8	21	29
3	1,982	.....	.....	.....	29	107	136
.....	21	.....	.....	.....	8	3	11
.....	126	.....	.....	.....	2	1	3
.....	102	.....	.....	.....	6	1	7
.....	33	.....	.....	.....	3	5	8
.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....
.....	57	.....	.....	.....	2	1	3
.....	.....	.....	.....	.....	.....	.....	.....
13	7,764	3	.....	3	274	514	788

TABLE

Showing the number of prisoners, how maintained, cost of maintenance, and

Name of gaol.	Name of gaoler.	How Maintained.				
		Total number of prisoners committed during the year.	Number of prisoners whose maintenance was defrayed by the Province.	Number of prisoners whose maintenance was defrayed by the municipalities.	Number of days' custody of Government prisoners.	Number of days' custody of municipal prisoners.
Barrie	H. E. Stoddart	204	38	166	875	3,530
Belleville	T. Ketcheson	322	201	121	2,546	2,847
Brantford	J. Y. Brown	337	61	276	1,009	2,702
Brampton	Jas. McClure	29	10	19	85	194
Brockville	W. R. Scace	199	108	91	1,793	1,656
Bracebridge	D. McDonald	22	22	.....	813	.....
Cayuga	Thos. Walsh	62	16	46	272	1,166
Cornwall	T. W. Ault	73	33	40	1,231	1,051
Cobourg	G. L. McLaughlin	148	24	124	530	2,967
Chatham	Jno. Davidson	221	47	174	1,727	3,186
Fort Frances	W. E. Lowe	144	101	43	2,061	210
Goderich	J. C. Griffin	51	9	42	186	1,826
Guelph	Jno. McNab	72	57	15	1,720	283
Gore Bay	S. Cronkhite	19	19	.....	1,362	.....
Hamilton	Jas. Ogilvie	1,678	231	1,447	5,111	15,573
Kingston	C. H. Corbett	228	35	193	980	5,608
Kitchener	J. Cook	161	48	113	1,492	2,038
Kenora	L. Myles	24	24	.....	885	.....
London	Jas. Carter	836	102	734	1,522	7,253
Lindsay	G. A. Balfour	31	9	22	155	519
L'Orignal	F. Millette	28	18	10	825	944
Milton	A. McGibbon	185	15	170	421	1,825
Napanee	W. E. Loyst	57	17	40	378	483
North Bay	W. J. Bailey	171	165	6	6,660	50
Ottawa	A. G. Dawson	863	428	435	9,710	7,081
Owen Sound	W. A. Grier	84	27	57	859	3,581
Orangeville	Chas. Bowles	30	23	7	433	4,069
Perth	John Oates	77	27	50	951	2,123
Picton	A. Huyck	96	13	83	116	300
Pembroke	Wm. Brown	113	34	79	787	1,786
Peterborough	H. Nesbitt	267	26	241	805	3,814
Port Arthur	Thos. Penfold	353	353	.....	6,188	.....
Parry Sound	J. A. Johnston	861	861	.....	5,194	.....
Simcoe	O. Robertson	106	40	66	1,481	893
St. Catharines	Geo. Bush	243	123	120	1,822	1,733
Sarnia	J. N. Dodd	245	30	215	672	3,472
Stratford	H. Nichol	109	31	78	1,162	1,116
Sandwich	Jno. Harman	192	122	70	1,879	2,742
St. Thomas	W. F. Luton	116	19	97	852	1,897
Sault Ste. Marie	R. M. Hearst (acting)	236	236	.....	5,704	.....
Sudbury	T. Keaney	1,164	1,164	.....	9,591	.....
Toronto	A. B. Chambers	4,912	850	4,062	21,433	25,391
Walkerton	D. McKechnie	42	16	26	267	1,036
Woodstock	Chas. Wilson	255	53	202	889	2,464
Welland	J. Kottmuir	231	95	136	1,926	3,159
Whitby	J. E. Schiller	84	55	29	1,389	734
Lock-ups:						
Atikokan	H. McDonald	.....	.....	.....	.....	.....
Byng Inlet	B. Moore	9	9	.....	.....	.....
Cobalt	A. T. Rowell	100	100	.....	.....	.....
Mine Centre	J. R. Gilbert	10	10	.....	.....	.....
Totals	.....	16,100	6,155	9,945	108,749	123,302

No, 8.

salaries of various gaol officials for the year ended 30th September, 1916.

Expenditure.					Salaries.			
Cost of fuel, food and clothing.	Cost of official salaries.	Cost of repairs.	Total gaol expenditure for the year.	Average cost per prisoner for entire gaol expenditure.	Gaolers.	Turnkeys.	Matrons.	Gaol surgeons.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
1,362 00	2,156 00	323 86	3,841 86	18 88	850 00	756 00	350 00	200 00
1,767 00	1,850 00	50 00	3,667 00	11 38	700 00	550 00	300 00	300 00
850 82	2,616 62	52 77	3,520 21	10 44	900 00	1,166 62	250 00	300 00
388 67	1,350 00	105 65	1,844 32	63 59	550 00	450 00	250 00	100 00
918 52	1,965 00	311 75	3,195 27	16 05	1,000 00	650 00	165 00	150 00
326 25	750 00	28 00	1,104 25	50 19	500 00	.....	100 00	150 00
826 79	780 00	62 43	1,669 22	26 92	600 00	.....	40 00	140 00
1,074 59	1,750 00	100 00	2,924 59	40 06	1,000 00	400 00	250 00	100 00
1,932 93	1,930 00	80 10	3,943 03	26 64	800 00	730 00	200 00	200 00
1,524 56	2,448 00	.....	3,972 56	17 97	800 00	1,240 00	208 00	200 00
296 74	1,480 00	.....	1,776 74	12 33	550 00	730 00	200 00	.....
1,148 58	1,670 00	.....	2,818 58	55 26	750 00	600 00	200 00	120 00
1,140 88	1,875 00	.....	3,015 88	41 88	800 01	675 00	300 00	100 00
814 49	600 00	10 20	1,424 69	74 98	450 00	.....	150 00	.....
4,239 82	4,600 00	914 50	9,754 32	5 81	1,200 00	2,900 00	350 00	150 00
1,878 53	2,850 00	41 20	4,769 73	20 92	1,100 00	1,250 00	300 00	200 00
1,286 23	1,655 00	144 12	3,085 35	19 16	750 00	630 00	140 00	135 00
866 14	1,852 41	.....	2,718 55	109 07	536 74	924 00	191 67	200 00
3,012 00	4,722 00	180 00	7,914 00	9 46	1,000 00	2,652 00	720 00	350 00
525 54	1,700 00	82 50	2,308 04	74 45	700 00	700 00	200 00	100 00
458 18	1,281 25	5 95	1,745 38	62 33	600 00	456 25	150 00	75 00
501 88	1,475 00	24 76	2,001 64	10 81	700 00	500 00	200 00	75 00
373 23	940 40	25 00	1,338 63	23 48	765 40	.....	100 00	75 00
2,060 05	2,300 00	90 55	4,450 60	26 02	600 00	1,375 50	175 00	150 00
4,745 40	5,191 16	144 69	10,081 25	11 68	1,200 00	3,241 16	400 00	350 00
2,116 12	2,130 41	119 67	4,366 20	51 97	800 00	780 41	300 00	250 00
1,711 41	1,500 00	33 73	3,245 14	108 17	700 00	500 00	200 00	100 00
952 90	1,900 00	25 25	2,878 15	37 37	800 00	800 00	200 00	100 00
260 00	975 00	.....	1,235 00	12 88	700 00	.....	200 00	75 00
778 62	1,980 00	.....	2,758 62	24 41	1,000 00	730 00	150 00	100 00
908 08	1,600 00	158 53	2,666 61	9 96	750 00	550 00	150 00	150 00
2,394 40	4,090 00	48 90	6,533 30	18 49	900 00	2,640 00	300 00	250 00
846 45	1,580 00	30 00	2,456 45	2 85	600 00	730 00	100 00	150 00
472 70	1,475 00	89 53	2,037 23	19 21	600 00	600 00	200 00	75 00
896 00	1,950 00	60 00	2,906 00	11 96	900 00	600 00	300 00	150 00
726 94	1,816 50	210 10	2,753 54	11 23	675 00	716 50	225 00	200 00
927 85	1,750 00	78 80	2,756 65	25 28	700 00	640 00	260 00	150 00
2,237 35	2,750 00	200 00	5,187 35	27 02	800 00	1,450 00	300 00	200 00
524 99	1,971 25	38 20	2,534 44	21 84	800 00	821 25	200 00	150 00
1,927 39	3,033 33	110 34	5,071 06	21 48	833 33	1,800 00	200 00	200 00
1,606 94	3,240 00	.....	4,846 94	4 16	650 00	2,190 00	250 00	150 00
12,234 80	25,242 96	733 99	38,211 75	7 77	3,550 00	18,642 96	1,550 00	1,500 00
625 89	1,500 00	50 00	2,175 89	51 80	700 00	450 00	250 00	100 00
1,236 85	2,393 92	418 26	4,049 26	15 88	963 00	1,080 92	250 00	100 00
1,162 50	2,561 25	414 06	4,137 81	17 91	806 00	1,345 30	209 95	200 00
1,050 14	1,750 00	41 75	2,841 89	33 82	800 00	600 00	200 00	150 00
.....	150 00	.....	150 00	.....	150 00	.....	.....	.....
.....	300 00	7 00	307 00	34 11	300 00	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	300 00	.....	300 00	30 00	300 00	.....	.....	.....
69,918 14	119,727 46	5,646 14	195,291 74	12 13	39,179 47	60,243 87	11,884 62	8,420 00

TABLE No. 9.

Showing the number of escapes and deaths, the Revenue derived from prison labor, the cost of diet, the accommodation of the various gaols and the highest and lowest number of prisoners in custody during the year ending September 30th, 1916.

Name of gaol.	Prisoners who escaped and evaded recapture.	Prisoners who escaped and were recaptured.	Prisoners who died.	Number of cells in each gaol.	Greatest number of prisoners confined in gaol at any time during the year.	Lowest number of prisoners confined in gaol at any time during the year.	Actual cash revenue derived from prison labor.	Cost of daily rations for prisoners.
							$ c.	Cents.
Barrie	.....	.....	.....	23	27	7	.....	11.25
Belleville	.....	.....	.....	38	28	8	.....	11.54
Brantford	.....	.....	.....	24	24	2	.....	8.90
Brampton	.....	.....	.....	25	3	1	.....	14.22
Brockville	.....	.....	.....	34	29	4	.....	.....
Bracebridge	.....	.....	1	15	8	.....	.....	12.80
Cayuga	.....	.....	.....	14	10	1	.....	12.00
Cornwall	.....	.....	.....	17	15	2	.....	15.25
Cobourg	.....	.....	.....	24	26	2	.....	12.00
Chatham	.....	.....	1	37	27	4	.....	.....
Fort Frances	1	1	.....	12	12	1	.....	12.20
Goderich	.....	.....	.....	12	13	1	.....	17.00
Guelph	.....	.....	1	18	13	.....	.....	11.25
Gore Bay	.....	1	.....	12	9	1	.....	40.00
Hamilton	.....	.....	.....	60	78	16	.....	11.56
Kingston	.....	.....	.....	49	48	5	1,700 00	11.00
Kitchener	.....	.....	.....	20	16	4	.....	11.55
Kenora	1	.....	.....	14	11	.....	.....	14.10
London	.....	.....	.....	57	79	11	.....	10.00
Lindsay	.....	1	.....	24	7	1	.....	47.85
L'Orignal	.....	.....	.....	18	11	1	.....	14.00
Milton	.....	1	1	22	16	2	.....	12.74
Napanee	.....	.....	.....	18	12	.....	.....	10.43
North Bay	.....	.....	3	19	30	7	.....	12.00
Ottawa	1	.....	.....	93	64	28	322 00	10.70
Owen Sound	.....	.....	.....	32	18	7	.....	15.24
Orangeville	.....	.....	.....	22	18	7	.....	20.75
Perth	.....	.....	.....	18	18	4	216 00	11.75
Picton	.....	.....	.....	18	9	.....	.....	9.50
Pembroke	.....	.....	.....	24	19	2	.....	10.00
Peterborough	.....	.....	.....	18	25	6	.....	10.50
Port Arthur	.....	.....	.....	40	34	11	.....	12.60
Parry Sound	.....	.....	2	24	53	1	.....	10.51
Simcoe	.....	2	.....	18	14	2	.....	12.25
St. Catharines	.....	.....	.....	38	25	1	.....	11.75
Sarnia	.....	.....	.....	13	46	2	.....	9.70
Stratford	.....	.....	.....	30	14	1	.....	11.55
Sandwich	2	.....	.....	58	22	3	.....	13.75
St. Thomas	1	.....	.....	16	17	4	.....	11.12
Sault Ste. Marie	.....	.....	.....	34	25	6	.....	14.50
Sudbury	1	.....	1	22	55	11	.....	12.50
Toronto	3	1	3	270	183	71	.....	12.50
Walkerton	.....	.....	.....	24	7	1	.....	9.00
Woodstock	1	.....	.....	32	22	3	.....	9.68
Welland	.....	3	.....	50	25	4	.....	12.25
Whitby	.....	.....	.....	28	15	1	.....	12.50
Lock-ups :								
Atikokan	.....	.....	.....	7	.....	.....	.....	.....
Byng Inlet	.....	.....	.....	3	1	1	.....	40.00
Cobalt	.....	.....	.....	6	.....	.....	.....	.....
Mine Centre	.....	.....	.....	3	8	1	.....	75.00
Totals	11	10	13	1,547	.....	.....	2,238 00	.....

TABLE No. 10.

Showing the daily cost per prisoner in each of the gaols, excluding the District Lock-ups, for the year ending September 30th, 1916.

Name of gaol.	Number of prisoners committed during the year.	Total days' stay of prisoners during the year.	Cost of fuel, food and clothing.	Average cost per day for each prisoner.
			$ c.	Cents.
Barrie	204	4,405	1,362 00	30.91
Belleville	322	5,393	1,767 00	32.76
Brantford	337	3,711	850 82	22.92
Brampton	29	279	388 67	139.30
Brockville	199	3,449	918 52	26.63
Bracebridge	22	813	326 25	40.12
Cayuga	62	1,438	826 79	57.49
Cornwall	73	2,282	1,074 59	47.08
Cobourg	148	3,497	1,932 93	55.27
Chatham	221	4,913	1,524 56	31.05
Fort Frances	144	2,271	296 74	13.06
Goderich	51	2,012	1,148 58	57.08
Guelph	72	2,003	1,140 88	56.95
Gore Bay	19	1,362	814 49	59.80
Hamilton	1,678	20,684	4,239 82	20.49
Kingston	228	6,588	1,878 53	28.51
Kitchener	161	3,530	1,286 23	36.43
Kenora	24	885	866 14	99.11
London	836	8,775	3,012 00	34.32
Lindsay	31	674	525 54	78.07
L'Orignal	28	1,769	458 18	25.90
Milton	185	2,246	501 88	22.34
Napanee	57	861	373 23	43.34
North Bay	171	6,710	2,060 05	30.70
Ottawa	863	16,791	4,745 40	28.26
Owen Sound	84	4,449	2,116 12	47.66
Orangeville	30	4,502	1,711 41	38.01
Perth	77	3,074	952 90	30.99
Picton	96	416	260 00	62.50
Pembroke	113	2,573	778 62	30.26
Peterborough	267	4,619	908 08	19.66
Port Arthur	353	6,188	2,394 40	38.69
Parry Sound	861	5,194	846 45	16.29
Simcoe	106	2,374	472 70	19.91
St. Catharines	243	3,555	896 00	25.20
Sarnia	245	4,144	726 94	17.54
Stratford	109	2,278	927 85	40.72
Sandwich	192	4,621	2,237 35	48.39
St. Thomas	116	2,749	524 99	19.09
Sault Ste. Marie	236	5,704	1,927 39	33.79
Sudbury	1,164	9,591	1,606 94	16.75
Toronto	4,912	46,824	12,234 80	26.12
Walkerton	42	1,303	625 89	48.03
Woodstock	255	3,353	1,236 85	36.87
Welland	231	5,085	1,162 50	22.86
Whitby	84	2,123	1,050 14	49.46
Totals	15,981	232,051	69,918 14	30.09

TABLE No. 11.

Showing the number of prisoners, male and female, sentenced during the year ending September 30th, 1915, and a comparison of the same with the current year.

Name of gaol.	No of Prisoners sentenced in the year ending 30th September, 1915.			No. of Prisoners sentenced in the year ending 30th September, 1916.			Increase.			Decrease.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
Barrie	195	9	204	160	6	166				35	3	38
Belleville	276	7	283	135	9	144		2	2	141		141
Brantford	157	9	166	176	3	179	19		19		6	6
Brampton	15	1	16	5	1	6				10		10
Brockville	85	5	90	119	20	139	34	15	49			
Bracebridge	31	3	34	12		12				19	3	22
Cayuga	73	1	74	39	1	40				34		34
Cornwall	76	2	78	47	5	52		3	3	29		29
Cobourg	55	3	58	119	3	122	64		64			
Chatham	104	7	111	133	10	143	29	3	32			
Fort Frances	149	1	150	77	1	78				72		72
Goderich	32		32	26		26				6		6
Guelph	66	5	71	51	2	53				15	3	18
Gore Bay	13	1	14	12	3	15		2	2	1		1
Hamilton	833	86	919	1,130	78	1,208	297		297		8	8
Kingston	289	31	320	178	13	191				111	18	129
Kitchener	112	6	118	98	3	101				14	3	17
Kenora	34	2	36	17	1	18				17	1	18
London	668	33	701	479	23	502				189	10	199
Lindsay	26		26	12		12				14		14
L'Orignal	23	6	29	23	1	24					5	5
Milton	32		32	42		42	10		10			
Napanee	51	4	55	43	2	45				8	2	10
North Bay	276	20	296	124	15	139				152	5	157
Ottawa	493	80	573	338	82	420		2	2	155		155
Owen Sound	94	4	98	60	4	64				34		34
Orangeville	17	2	19	20	2	22	3		3			
Perth	80	1	81	51	3	54		2	2	29		29
Picton	13		13	12		12				1		1
Pembroke	116	1	117	103	3	106		2	2	13		13
Peterborough	133	11	144	89	18	107		7	7	44		44
Port Arthur	685	23	708	272	18	290				413	5	418
Parry Sound	161	3	164	696	5	701	535	2	537			
Simcoe	45	1	46	67	1	68	22		22			
St. Catharines	168	3	171	173	5	178	5	2	7			
Sarnia	213	1	214	168	7	175		6	6	45		45
Stratford	89	1	90	64	1	65				25		25
Sandwich	174	4	178	87	8	95		4	4	87		87
St. Thomas	73	9	82	46	9	55				27		27
Sault Ste. Marie	191	12	203	147	24	171		12	12	44		44
Sudbury	1,422	26	1,448	501	27	528		1	1	921		921
Toronto	3,252	562	3,814	1,953	406	2,359				1,299	156	1,455
Walkerton	35	2	37	21		21				14	2	16
Woodstock	98	3	101	147	3	150	49		49			
Welland	298	3	301	150	6	156		3	3	148		148
Whitby	94	3	97	52		52				42	3	45
Lock-ups:												
Antikokan	2		2							2		2
Byng Inlet	11		11							11		11
Cobalt	38		38	50	8	58	12	8	20			
Mine Centre.												
Totals	11,666	997	12,663	8,524	840	9,364	1,079	76	1,155	4,221	233	4,454

Forty-Ninth Annual Report

OF THE

INSPECTOR OF

Prisons and Reformatories

OF THE

PROVINCE OF ONTARIO

BEING FOR TWELVE MONTHS ENDING 31st OCTOBER

1916

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed and published by A. T. WILGRESS, Printer to the King's Most Excellent Majesty
1917

PARLIAMENT BUILDINGS, TORONTO, January 26th, 1917.

To His Honour SIR JOHN STRATHEARN HENDRIE, C.V.O., a Colonel in the Militia of Canada, etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I beg to submit herewith the Forty-ninth Annual Report upon the Prisons and Reformatories, being for the year ending 31st October, 1916.

I have the honour to be,

Your Honour's most obedient servant,

W. D. MCPHERSON,

Provincial Secretary.

Toronto, November 14th, 1916.

Sir,—I have the honour to submit herewith, to be presented to His Honour the Lieutenant-Governor, the Forty-ninth Annual Report upon the Prisons and Reformatories of the Province of Ontario, being for the year ending 31st October, 1916.

I have the honour to be, Sir,

Your obedient servant,

W. W. Dunlop,

Inspector.

The Honourable W. D. McPherson, M.P.P.,
Secretary of the Province of Ontario,
Toronto.

THE ONTARIO REFORMATORY, GUELPH, CANADA.

December 14th, 1916.

SIR,—In submitting the Annual Report for the Official Year just closed, you will observe that our population has been far below normal, no doubt owing to the fact that many men who would have drifted into prison have exercised their nobler spirit and offered their lives on behalf of their country and human liberty.

During the past year considerable numbers of our men have enlisted immediately on their discharge, while many others would gladly enlist were they permitted to do so. The loyalty of our inmates clearly demonstrates that it is only a step from prisoner to patriot.

I desire to strongly recommend the establishment of a school, as our statistical report reveals the fact that 132 of our inmates last year were wholly illiterate, and it is painful to think that we gave them no educational advantages.

I beg further to recommend the re-establishment of the tailor shop, as it is one of the most valuable educative methods an institution can have.

Tailoring is a trade particularly well adapted for cripples and certain physical types which are of little value either to themselves or the Institution in other forms of labour. We usually have a fair number of first class tailors whose services would be lucrative in the tailor shop, but whose work is of little value elsewhere. When you close an educative institutional industry for the reason that it cannot compete financially with free labour you place Commercialism before Reformation and ignore the spirit for which a Reformatory stands.

Re General Superintendent here. When the Official Rules and Regulations were being drafted for the Ontario Reformatory I approved of the appointment of a Director of Industries, but I frankly state that at that time I had no conception of such an organization as exists here to-day. The Custodial and Industrial Departments dovetail into each other at many points, and there should be one, and only one, supreme institutional authority. During the past year maliciously untruthful reports have been made by officials of one department against officials of another department without revealing the identity of those making the reports. Such conditions are fatal to a proper institutional atmosphere—an atmosphere essential to successful work. Such acts would be impossible were every member of the staff responsible to one General Superintendent.

I desire to strongly recommend that the Official Rules and Regulations be changed so as to provide for one General Superintendent, who shall have authority over every department of the Institution and every member of the Reformatory Official Staff.

In view of my prospective early retirement from my position it cannot be said that I am seeking personal power. Numerous episodes, many of them intensely painful, have shown the need of this change during the past year.

The Ontario Parole Board continue to manifest their deep interest in all that pertains to the betterment of those who come to the Reformatory. Each member of the Patrol Board finds no detail too minute in which to interest himself personally on behalf of those who come before him. During the past year 369 men appeared before the Parole Board, and from this number the Board released 33, and recommended the release by the Department of Justice of 145.

During the past year Mr. J. A. McCrea and a faithful band of teachers and singers have given of their best in conducting a splendid Sunday school at the Reformatory. The Guelph Ministerial Association have very kindly arranged our Sunday services, one-half of which are taken by our never-failing friends, the Salvation Army. Major and Mrs. Frazer have been unremitting in their uplift work among our boys. The Reverend Father Quirk ministers faithfully and successfully to our Roman Catholic population.

The Custodial Staff, and a great majority of all those connected with the Institution, have given me a loyal and most helpful support for which I am deeply grateful.

I desire to thank you and those officials of the Provincial Secretary's Department who have assisted me during the past year.

I have the honour to be, Sir,

Your obedient servant,

J. T. GILMOUR,

Superintendent.

MR. E. R. ROGERS,
Inspector, Prisons and Public Charities,
Parliament Buildings, Toronto, Ontario.

This first table shows the committals and discharges during the past three years:

	1914	1915	1916
In custody at commencement of year (November)	755	851	595
Committed during the year	1,593	1,029	1,001
	2,348	1,880	1,596
Discharged on expiration of sentence	1,186	825	792
Discharged by ticket of leave	246	347	221
Discharged by payment of fine	7	9	5
Remission of sentence	6	10	6
Released on order in Council	1	4	3
Conditional release	..	1	2
Transferred to County Gaols	..	..	5
Transferred to Kingston Penitentiary	..	1	1
Transferred to Lunatic Asylum	3	7	1
Transferred to Common Gaol as unfit for labour	9	3	4
Transferred to Industrial Farm, Thornhill	1	..	..
Transferred to Industrial Farm, Burwash	..	1	61
Transferred to Sanatorium	1	1	..
Released on Habeas Corpus	1	2	..
Died in Prison Hospital	3	1	1
Escaped	32	68	92
Remaining in custody	851	595	402
	2,348	1,880	1,596

The number of prisoners sentenced direct to the prison, and of those sentenced to the gaols and afterwards removed to the Ontario Reformatory, is shown in the following summary:

	1914	1915	1916
Sentenced direct	1,206	733	560
Transferred from common gaols	381	292	441
Transferred to Industrial Farm, Fort William	1	..	..
Transferred to Industrial Farm, Thornhill	5	..	..
Transferred to Industrial Farm, Langstaff	..	4	..
	1,593	1,029	1,001

Social Conditions.	Committed during the year.	Total commitments.
Married	376	9,186
Single	625	21,991
	1,001	31,177
Habits.		
Abstainers	310	7,721
Moderate	479	1,792
Intemperate	212	21,664
	1,001	31,177
Educational Status.		
Read and write	863	25,817
Read (only)	6	1,324
No education	132	4,036
	1,001	31,177

The inmates received during the year, who were reported to be of temperate habits, represented 39 per cent.

The inmates received during the year, who were reported to be of moderate habits, represented 47 per cent.

The inmates received during the year, who were reported to be of intemperate habits, represented 21 per cent.

The total uneducated men represented 13 per cent.

This table shows how releases were effected by ticket of leave, Ontario Parole Commission, and by Minister of Justice (direct).

Ticket of leave	146
Ontario Parole Commission	33
Released by Minister of Justine (direct)	42
Total	221

The table annexed shows how the inmates were employed and the number of days' work which was performed by them at the different industries:

Wood shop	6,421 days.
Broom shop	275 "
Tailoring shop	2,326 "
Shoe shop	723 "
Woollen mill	6,676 "
Machine shop, including blacksmith	7,127 "
Paint shop	1,136 "
Laundry	1,449 "
Engineers, firemen, steamfitters, electrician	6,328 "
Parks and greenhouse	322 "
Construction—permanent improvements	4,714 "
Repairs and alterations	1,370 "
Land improvements	5,012 "
Farm	1,150 "
Piggery	504 "
Dairy barn	2,616 "
Horse stables	450 "
Teamsters	1,152 "
Railway	704 "
Quarry	1,616 "
Hydrator and lime kiln	1,023 "
Stone crusher	864 "
Abattoir	2,457 "
Store room	72 "
	56,487 "

Domestic and Kitchen Department.

Number of days domestic work	5,624 days.
Number of days kitchen, bakers, butchers	5,982 "
	11,606 "

The table annexed shows the number of days inmates were in the hospital, sick in cells, under punishment and attending court.

Hospital and sick in cells	2,736 days.
Under punishment	201 "
Attending court	39 "
	2,976 "

Table of comparisons, industrial work and domestic work, taking an average of 9 hours per day, six days per week.

	1915	1916
Wood shop	3,006 days	6,421 days.
Broom shop	1,088 "	275 "
Tailoring shop	5,320 "	2,326 "
Shoe shop	2,182 "	723 "
Woollen mill	11,023 "	6,676 "
Machine shop, including blacksmith	15,444 "	7,122 "
Paint shop	2,169 "	1,136 "
Laundry	630 "	1,448 "
Engineers, firemen, steamfitters, electricians	.... "	6,328 "
Parks and greenhouses	3,166 "	322 "

Construction—permanent improvement	2,484	days	4,714	days.
Repairs and alterations	605	"	1,370	"
Land improvements	519	"	5,012	"
Farm	1,306	"	1,150	"
Piggery	223	"	504	"
Dairy barn	942	"	2,616	"
Horse stables	242	"	450	"
Teamsters	899	"	1,152	"
Railway	61	"	704	"
Quarry	667	"	1,616	"
Hydrator and lime kiln	568	"	1,023	"
Stone crusher	126	"	864	"
Abattoir	859	"	2,457	"
Store room	....	"	72	"
	53,480	"	56,487	"
Domestic and kitchen departments	15,711	"	11,606	"
Totals	69,191	"	68,093	"

WHITBY, ASYLUM PRISON FARM.—MIMICO, CLAY PLANT PRISON FARM.

General summary of labour distribution performed at the above institutions:

WHITBY ASYLUM PRISON FARM.

From 1st November, 1915, to 27th April, 1916 ..... 39,960 days.

MIMICO CLAY PLANT PRISON.

From 1st November, 1915, to October 31st, 1916 ..... 19,104 days.

ONTARIO REFORMATORY, GUELPH.

ANNUAL RETURN.

FOR THE TWELVE MONTHS COMMENCING 1ST NOVEMBER, 1915, AND ENDING 31ST OCTOBER, 1916.

Remaining in custody, November 1st, 1915	595
Committed during the twelve months	1,001
	1,596
Discharged on expiration of sentence	792
Discharged by ticket of leave	221
Discharged by payment of fine	5
Remission of sentence	6
Released on order in Council	3
Conditional release	2
Transferred to County Gaols	5
Transferred to Kingston Penitentiary	1
Transferred to Lunatic Asylum	1
Transferred to Common Gaol as unfit for labour	4
Transferred to Industrial Farm, Burwash	61
Died in Ontario Reformatory	1
Escapes	92
Remaining in custody	402
	1,596

Nature of Sentences.

Sentenced direct to the Ontario Reformatory or to the Common Gaols:	
To Ontario Reformatory	560
To Common Gaol	441
	1,001

Habits.

Abstainers	310
Moderate	479
Intemperate	212
	1,001

Social Relation.

Married	376
Single	625
	1,001

Educational Status.

Read and write	863
Read (only)	6
No education	132
	1,001

Number of times inmates have been sent to the Reformatory:

First	762
Second	135
Third	55
Fourth	16
Fifth	3
Sixth	3
Seventh	4
Eighth	2
Ninth	1
	1,001

Sentences.

30 days	7
40 "	1
50 "	6
60 "	34
84 "	2
90 "	90
2 months	18
3 "	194
144 days	1
140 "	4
3½ months	1
4 "	44
5 "	10
6 "	259
7 "	4
8 "	2
9 "	28
10 "	3
12 "	142
367 days	1
15 months	4
18 "	29
20 "	1
21 "	1
22 "	3
23 "	5
24 "	32

Indefinites.

3 to 12 months	2
3 " 15 "	1
3 " 24 "	15
4 " 24 "	3
5 " 6 "	1
3 " 6 "	1
4 " 20 "	1
6 " 12 "	4
6 " 24 "	28
9 " 24 "	1
12 " 18 "	1
12 " 24 "	7
Ind. 6 "	7
" 24 "	3
	1,001

Religious Denominations.

Anglicans	234
Baptists	40
Congregationalists	1
Disciples	1
Hebrews	8
Lutherans	7
Methodists	160
Presbyterians	153
Roman Catholics	375
Salvation Army	4
Greek	5
Orthodox	1
7th Day	2
Mormon	1
No Religion	9
	1,001

Ages.

Under 18 years	40
From 18 to 20	107
" 20 to 30	388
" 31 to 40	252
" 41 to 50	133
" 51 to 60	59
" 61 to 70	22
	1,001

Nationalities.

Canada	590
England	112
United States	89
Norway	1
Ireland	41
Scotland	24
Italy	32
Bulgaria	6
Australian	1
Austria	33
Servia	2
Russia	38
Hungary	1
Greece	2
Roumania	2
China	3
Germany	3
Turkey	2
Denmark	3
India	4
Sweden	3
Macedonia	3
Finland	1
Newfoundland	2
Belgium	2
Balkan States	1
	1,001

Occupations.

Labourers	402
Bakers	2
Firemen	16
Dairyman	1
Painters	22
Teamsters	61

Butchers	11
Farmers	73
Clerks	26
Ironworkers	3
Machinists	15
Stenographer	2
Salesmen	9
Cooper	2
Waiters	22
Tailors	14
Brakemen	3
Cooks	25
Barbers	13
Motormen	2
Moulders	8
Chefs	2
Ropemaker	1
Spinner	2
Wagonmaker	1
Carpenters	12
Presser	1
Porter	5
Bricklayer	5
Solicitor	1
Tinsmith	3
Shoemakers	11
Electricians	9
Woodworkers	3
Cotton mill operators	2
Lumbermen	5
Sailors	2
Agents	5
Engineers	21
Soldiers	31
Merchants	2
Plasterer	1
Horsemen	5
Steamfitters	18
Decorator	1
Pedlars	3
Roofer	1
Bookkeepers	9
Bell boy	1
Hatmaker	1
Male nurse	1
Hostler	1
Paper mill operator	1
Boilermakers	2
Blacksmiths	6
Rubberworker	1
Fruit merchant	1
Bank clerks	4
Physician	1
Chauffeur	8
Railroaders	3
Vaudeville performers	2
Masons	3
Paper hanger	1
Drug clerks	3
Lathers	2
Acid maker	1
Cigar makers	5
Photofilm examiner	1
Foremen	4
Fur workers	5
Sculptor	1
Plumbers	6
Steel worker	3
Brass polisher	1
Printers	3
Contractor	1
Teacher	1
Glass blower	1
Cheesemakers	2
Marine oiler	1
Jockey	1
Bartender	1
Business man	1
Bookbinder	1
Fisherman	1
Accountant	1
Barrister	1
Paper maker	1
Trapper	2
Miner	1
Auto worker	2
Car inspector	1
Boiler washer	1
Bill posters	2
Woolworkers	3
Silver finishers	1
Writer	1
Gardener	1
Linesman	2
Grinder	1
No trade	2
	1,001

Crimes Committed.

Assault	13
Assault, A.O.B.H.	35
Assault and wounding	1
Assault with intent	7
Assault to rob	2
Assault and attempt sodomy	1
Assault on police officer	2
Assault on wife and non-support	1
Attempted perjury	1
Attempt theft from person	1
Attempt to procure for act of indecency	1
Attempt shop-breaking	1
Attempt desert from H.M.S.	3
Attempt to procure	1
Attempt to commit bigamy	1
Attempt to commit rape	1
Attempt to wound	1
Administering liquor and indecent assault	1
Arson	2
Administering drugs to procure abortion	1
Abduction	2
Absenting H.M.S.	149
Abduction and fraud	1
Aggravated assault	5
Bad conduct	2
Bigamy	7
Breaking, entering and larceny	16
Breach of military regulations	4
Bigamy and neglect	1
Burglary and larceny	4
Bestiality	1
Breaking and entering	7
Buggary	1
Burglary and larceny	9

Contributing to juvenile delinquency	1
Carnal knowledge	3
Carrying unlawful weapons	1
Desertion	7
Drunkenness	12
Drunk and disorderly	8
Deserting H.M.S.	53
Disorderly	3
Defiance of authority	2
Deserting steamship	2
Drunk and helpless	1
Escape from custody	11
False pretences	19
Fraud	5
Forgery and uttering	3
Forgery	7
False pretences and forgery	2
False statement	6
Fraud and receiving	1
Horse stealing	3
Illegal possession of drugs	15
Illegal sale of liquor	6
Illegal sale of drugs	5
Indecent assault	12
Indecent exposure	6
Incorrigible	2
Inmate of disorderly house	1
Keeping disorderly house	6
Keeping common betting house	2
Keeping house of ill-fame	3
Keeping a bawdy-house	6
Keeping liquor for sale without license	1
Killing and stealing a sheep	1
Larceny	36
Larceny and receiving	1
Larceny and escape	1
Leaving his post of duty	1
Neglect of military duties	2
Neglecting family	5
Larceny and shop-breaking	4
Living by avails of prostitution	4
Obtaining money by false pretences	1
Perjury	3
Publishing false news	1
Parental neglect	2
Perjury and escape from custody	1
Picking pockets and O.A.B.H.	1
Possession of dangerous weapons	2
Receiving	4
Receiving stolen goods	1
Robbery with violence	1
Robbery	6
Selling without license	66
Selling liquor to Indian	1
Seduction	3
Selling liquor to soldier	2
Stab with intent	1
Shooting with intent	1
Theft	156
Theft and receiving	8
Theft from person	9
Threatening to steal with intent	1
Theft and forgery	3
Theft from railway	2
Theft and wounding	1
Theft from a dwelling	1
Theft of liquor	1
Theft from soldier	1
Threatened arson and assault	1
Uttering	1
Unlawful possession of liquor	2
Unlawfully wounding	1
Using obscene language	3
Unlawfully obtaining liquor when on In. Lt.	1
Vagrancy	132
Vagrancy and assault	1
Violation of parole	1
Wife beating	2
Wounding with intent	3
Wilful destruction of property	2
Wounding	4
Violating liquor law	1
Gross indecency	5
Keeping girl under 18 for immoral purpose	1
Shop-breaking and receiving	6
	1,001

The Different Counties and Districts Where Sentenced From.

Algoma	21
Brant	18
Carleton	27
Durham	4
Elgin	15
Essex	19
Frontenac	26
Grey	9
Hastings	23
Haliburton	6
Lambton	22
Leeds	6
Lennox	2
Kent	21
Middlesex	37
Nipissing	12
Norfolk	17
Ontario	9
Oxford	11
Perth	4
Peel	2
Peterboro	16
Rainy River	2
Stormont	25
Simcoe	66
Picton	3
Lincoln	45
Thunder Bay	8
Wentworth	154
Welland	57
Wellington	15
Waterloo	14
York	280
Prescott	1
Manitoulin	1
Muskoka	2
Bruce	1
	1,001

ANNUAL RETURN OF THE ANDREW MERCER ONTARIO REFORMATORY FOR FEMALES, FOR THE YEAR ENDING OCTOBER 31ST, 1916.

	1915	1916
Number of inmates at beginning of year	101	101
Number of inmates since admitted	133	123
Recaptured	..	2
Retransferred from Good Shepherd Reformatory	1	..
Retransferred from Welland Gaol	..	1
Returned from House of Providence	..	1
Returned from Weston Sanitarium	..	1
Returned from Toronto General Hospital	..	2
Returned from Temporary Situations and Parole	..	16
	235	247
Discharged by expiration of sentence	71	53
Discharged by ticket-of-leave	47	36
Discharged by H. R. H. the Governor-General	2	..
Discharged by order of Inspector	5	19
Deported	4	4
Escaped	..	2
Transferred to Toronto General Hospital	..	7
Transferred to Industrial Refuge	1	2
Transferred to Haven	..	4
Transferred to House of Providence	..	1
Transferred to Toronto Hospital for Insane	..	1
Transferred to Mimico Hospital for Insane	..	1
Transferred to Women's Farm	1	6
Transferred to Weston Sanitarium	1	..
Transferred to Welland Gaol	..	1
Transferred to gaol	1	..
Transferred to Good Shepherd Female Refuge	1	..
Released by order of Court	..	1
Released by *Habeas Corpus*	..	1
Released by fine paid	..	1
	134	140
In custody at close of year (October 31st)	101	107
Number of days' stay—Reformatory	39,323	41,993
Infants	755	1,290
Average daily population	109.80	118.58

Nature of Sentence.

Sentenced directly to the Reformatory	119
Sentenced to common gaols, etc.	4
	123

Temperate or Intemperate.

Temperate	77
Intemperate	46
	123

Social Conditions.

Married	62
Single	53
Widow	8
	123

Education.

Read and write	95
No education	28
	123

Occupations.

Charwoman	9
Clerk	1
Domestics	43
Factory	5
Housekeepers	14
Laundresses	2
Masseuse	1
No occupation	44
Seamstress	2
Waitresses	2
	123

Ages.

Under 18 years	11
From 18 to 20 years	34
From 20 to 30 years	51
From 30 to 40 years	19
From 40 to 50 years	5
From 50 to 60 years	3
	123

Sentences.

For 1 month and 27 days	1
For 3 months	1
For 5 months	1
For 6 months	36
For 6 months and fine or additional 6 months	1
For 9 months	2
For 1 year	23
For 15 months	4
For 18 months	1
For not less than 6 months or more than 12 months	1
For an indefinite term not exceeding 12 months	1
For not more than 1 year or less than 6 months	1
For 3 months, and 21 months less 1 day	1
For 2 years	3
For an indefinite period	41
For balance of parole	5
	123

Nationality.

Canada	83
England	17
Finland	1
Hungary	1
Ireland	5
Macedonia	1
Russia	1
Scotland	4
United States	10
	123

Offences.

Assault	1
Breaking parole	1
Commit an indecent act	1
Carrying an offensive weapon	1
Creating a disturbance on public streets	1
Drunk while on parole	1
Drunkenness	2
Escape from lawful custody	3
Escape from gaol	1
Endeavour to persuade a soldier to desert	1
Frequenting house of ill-fame	4
Forgery and fraud	2
Inmate of house of ill-fame	11
Keeping disorderly house and house of ill-fame	17
Living in adultery to neglect of her children	1
Procuring and prostitution	1
Prostitution	21
Theft	5
Theft and receiving	2
Unlawfully dispose of dead body of child	1
Vagrancy	44
Wilfully by reason of drunkenness and debauchery, neglect of her four children	1
	123

Religion.

Baptists	6
Catholics	40
Church of England	38
Greek Catholics	1
Lutheran	2
Methodist	19
None	1
Presbyterian	13
Protestant	1
Salvation Army	2
	123

Number of Terms Served in the Reformatory.

For first term	94
For second term	11
For third term	6
For fourth term	2
For fifth term	3
For sixth term	2
For seventh term	1
For eighth term	2
For eleventh term	1
For eighteenth term	1
	123

Counties.	Sentenced direct to Reformatory.	Sentenced to Common Gaol and transferred to the Reformatory.	
Algoma, district of	13	..	
Elgin	8	..	
Frontenac	2	2	
Hastings	6	..	
Haldimand	1	..	
Leeds	10	..	
Lennox	2	..	
Lincoln	..	2	
Northumberland	1	..	
Nipissing, district of	1	..	
Oxford	3	..	
Parry Sound	2	..	
Peterboro	13	..	
Simcoe	4	..	
Sudbury, district of	9	..	
Temiskaming, district of	1	..	
Welland	3	..	
Wentworth	11	..	
Waterloo	1	..	
York	28	..	
	119		4—123

NUMBER OF DAYS' WORK DONE BY INMATES DURING THE YEAR.

Industrial Department.

	Days.
Laundry	3,420
Knitting	554½
Sewing	16½
Making supplies for overseas hospital	1,091½
Factory (Mercer Ind.)	2,606½
	7,689

Domestic Labour.

Cooking, baking and dining-rooms	3,504½
Cleaning, painting, etc.	7,692
Gardening	604½
Laundry (house)	2,232
Nursery, hospital and sick	1,801½
Sewing, mending and knitting	7,242
Knitting socks for soldiers	2,373½
	25,450

REPORT

ON THE OPERATION OF THE

Liquor License Acts, Ontario

FOR THE YEAR

1916

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO.

TORONTO:
Printed and Published by A. T. WILGRESS, Printer to the King's Most Excellent Majesty
1917

Printed by
WILLIAM BRIGGS
Corner Queen and John Streets
TORONTO

To His Honour SIR JOHN STRATHEARN HENDRIE, K.C.M.G., C.V.O., a Colonel in the Militia of Canada, etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present to your honour the Report on the Operation of *The Liquor License Acts*, Ontario, for 1916.

Respectfully submitted,

WM. DAVID McPHERSON.

Secretary.

Provincial Secretary's Department,
January 15th, 1917.

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REPORT

ON THE OPERATION OF THE

LIQUOR LICENSE ACTS, ONTARIO

FOR THE YEAR 1916

THE BOARD OF LICENSE COMMISSIONERS FOR ONTARIO.

TORONTO, 1ST JANUARY, 1917.

TO THE HONOURABLE W. D. MCPHERSON,
Provincial Secretary of the Province of Ontario.

SIR,—In submitting the Report of the operation of *The Liquor License Act* for the year ended April 30, 1916, attention is called to important changes that have taken place in law and in administration. On May 5, 1915, the Board of License Commissioners for Ontario was installed in office, pursuant to statute passed in the preceding session of the Legislature, and the administration of the above mentioned Acts, and, since September 16, 1916, of the *Ontario Temperance Act*, has been in the hands of the Board.

The change from a system of local License Boards to one Central Board for the whole Province seems to have resulted satisfactorily, especially with respect to more uniform and effective law enforcement, promoting increased popular respect for law. The powers conferred upon the Board, though they may have seemed drastic to some, have been exercised, we hope, with scrupulous care and so as to warrant the support of the public of the Province. The principle of strong unified administration of laws of this nature is held, according to many expressions which have been made to the Board, to have been vindicated by the results.

The total number of tavern and shop licenses for the license year ended April 30, 1916, was 1,435, being a reduction of 66 from the previous year; this not including wholesale shops, clubs or summer hotel licenses, as to which details are given in a table following. The Legislature in the session of 1916 passed the *Ontario Temperance Act*, enacted to go into effect on September 16, 1916, the licenses existing at April 30, 1916, being automatically extended by the Act up to September 16, 1916, at a nominal fee of $5 for the extended period. The number of such extended tavern and shop licenses was 1381.

Under Section 146 of the *Ontario Temperance Act*, 1,536 licenses for Standard hotels have been issued, of which 162 have been surrendered, leaving 1,374 nominally in force. There is reason to believe a few others have gone out of business, it being estimated that between 1,200 and 1,300 Standard hotels are in operation at time of writing. There are indications that hotel accommodation for travelers has improved, through centering of attention under the new law upon the business of hotel-keeping proper. The next year under the *Ontario Temperance Act*, viz., the year beginning May 1, 1917, should repay study of this phase of the problem, since hotel-keeping as a business will then have had time to adjust itself more completely to the new conditions.

During the closing months of 1916 the force of Inspectors was reorganized in accordance with the *Ontario Temperance Act,* with the result that the Board feels the machinery for enforcement of the Act is in very satisfactory condition. The rule now is that Inspectors give their whole service to the Department, and that travelling expenses are allowed for, hence there is no occasion for an officer hesitating to pursue enquiries for fear of an inroad upon his salary.

As was to be expected from the ushering in of legislation of such a comprehensive character, the Board has had varied and continuous demands upon it. The sessions of the Board have been largely continuous, dealing daily with multifarious problems in law enforcement, conferring with Provincial and local Inspectors, receiving individuals or deputations on business directly growing out of the Act, hearing applications for relief from leases and remission of penalties, dealing with applications for native wine or manufacturers' permits, standard hotel licenses, besides voluminous correspondence, etc.

The tables and schedules following give much detailed information.

Schedule "A" is a statement of the number of licenses issued in the several counties and cities during the past forty-one years.

Schedule "B" gives in detail the amounts received for licenses from each city, town, incorporated village and township and unorganized territory of the Province, the amounts divided between the municipalities and the Province, and the number of licenses, extensions and transfers granted.

The licenses issued during the past eleven years are as follows:—

Years.	Licenses.								Extensions and transfers of licenses.		
	Tavern.										
	Yearly.		Six months.								
	Ordinary.	Beer and wine.	Ordinary.	Beer and wine.	Shop.	Wholesale.	Club.	Total.	Extensions.	Transfers.	Total.
1905-6.....	2,366	18	51	3	283	24	.....	2,745	144	751	895
1906-7.....	2,197	10	47	3	267	23	24	2,571	54	281	335
1907-8.....	2,102	8	43	3	265	25	35	2,481	52	420	472
1908-9.....	2,002	8	48	3	253	23	42	2,379	39	319	358
1909-10.....	1,866	7	40	3	245	33	50	2,244	43	315	358
1910-11.....	1,621	9	21	8	226	31	51	1,967	47	264	311
1911-12.....	1,531	6	30	2	221	30	52	1,872	27	258	285
1912-13.....	1,464	5	23	2	219	29	57	1,799	41	265	306
1913-14.....	1,368	3	28	3	218	28	63	1,711	27	214	241
1914-15.....	1,282	3	26	2	216	31	61	1,621	55	225	280
1915-16.....	1,219	5	32	2	211	28	64	1,561	24	148	182

Revenue.

The total amount paid to the Municipalities for the license year 1915-16 as shown by Schedule "B" was $323,777.82.

The revenue received by the Province for the license year from retail licenses, transfers, and fines amounted to $427,858.27.

A recapitulation of the receipts and expenditures for the year will be found on page 115.

Schedule "C."

The fines collected during the past year, as shown by this schedule, amount to $51,214.04, and in the Local Option municipalities, as shown in Schedule "K," the amount collected was $13,277.00.

Schedule "D."

The cost of operating and enforcing the Act in the several districts for the License Year is given in this Schedule.

The provincial inspectors, with the assistance of special officers, have energetically enforced the Act. The expenditure for this service for the financial year 1915-16 amounted to $36,057.55.

Commitments for Drunkenness.

Schedule "I" shows the number of Prisoners committed for drunkenness during the years from 1885 to 1916 inclusive. The number committed during the year 1916 as compared with 1915 shows a decrease of 267.

The average yearly commitments for each period of five years from 1876 to 1915, inclusive, are as follows:—

From 1876 to 1880 inclusive	3,812	From 1896 to 1900 inclusive	1,920
1881 to 1885 "	4,016	1901 to 1905 "	3,186
1886 to 1890 "	3,311	1906 to 1910 "	4,974
1891 to 1895 "	2,703	1911 to 1915 "	7,177

During the year ending October 31, 1916, the following seizures were made by members of the Ontario Police Force:—

4,628	bottles of whiskey.	27	bottles of wine.
100½	gallons of whiskey.	133¾	gallons of high wine.
1,682	bottles of gin.	5	barrels of beer.
5½	gallons of gin.	642	bottles of beer.
11	bottles of brandy.	47	bottles of rum.
3	gallons of brandy.	3	gallons of rum.
½	barrel of wine.		
1	keg of wine.		

The statement of receipts for liquor licenses, etc., for the Fiscal Year ending October 31, 1916, will be found on page 134.

Respectfully submitted,

J. D. FLAVELLE,
Chairman.

SCHEDULES.

SCHEDULE A.

COMPARATIVE STATEMENT BY COUNTIES AND CITIES, showing the number of (Provincial) **Tavern, Shop,** Wholesale and Vessel Licenses issued in the several Counties of the Province, and the Cities separated from Counties, for the license years 1874-5-6-7-8-9-80-1-2-3-4-5-6-7-8-9-90-1-2-3-4-5-6-7-8-9-1900-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15.

District.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses. ***	Vessel licenses.	Remarks.
Algoma (including Algoma, Manitoulin and Sudbury).	1874	30	14	.....	3	
	1875	36	15	.....	3	
	1876	18	6			
	1877	19	5			
	1878	19	5			
	1879	21	8	1		
	1880	22	6	1		
	1881	29	9	1		
	1882	35	9	1		
	1883	56	6	1		
	1884	74	12	2		
	1885	58	12	1		
	1886	62	16	1		
	1887	78	11	2		
	1888	83	16	1		
	1889	90	17			
	1890	94	15			
	1891	94	11			
	1892	92	11			
	1893	95	13			
	1894	93	12			
	1895	96	13	1		
	1896	99	13			
	1897	108	15			
	1898	111	14	.....	Club Licenses	
	1899	120	14			
	1900	118	13			
	1901	116	14	1		
	1902	131	15	1		
	1903	130	15	1		
	1904	140	16	1		
	1905	130	13			
	1906	123	11	.....	1	
	1907	120	11	.....	2	
	1908	130	12	.....	3	
	1909	135	13	.....	4	
	1910	129	14	.....	4	
	1911	127	14	.....	4	
	1912	123	14	.....	4	
	1913	111	14	.....	4	
	††1914	33	2	.....	1	
	1915	33	2	.....	1	

*** For Wholesale Licenses after 1905 see Schedule of Wholesale Licenses.
†† Northern Districts re-arranged. See Thunder Bay.

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Brant (not including City of Brantford).	1874	95	29			
	1875	73	22	2		
	1876	56	14	4		
	1877	.....	.....	7	.....	Dunkin Act in force.
	1878	53	11	5		
	1879	55	14	1		
	1880	57	14	1		
	1881	55	14	1		
	1882	59	13	1		
	1883	58	11	1		
	1884	49	7			
	1885	44	7	1		
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	26	2			
	1890	26	2			
	1891	22	2			
	1892	23	2			
	1893	23	1			
	1894	22	1			
	1895	18	1			
	1896	18	1			
	1897	18	1			
	1898	18	1			
	1899	18	1			
	1900	17	1			
	1901	18	1			
	1902	18	1			
	1903	17	1			
	1904	17	1			
	1905	18	1			
	1906	18	1			
	1907	16	1			
	1908	16	1			
	1909	16	1			
	1910	4	1			
	1911	4	1			
	1912	4	1			
	1913	4	1			
	1914	4	1			
	1915	4	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Bruce.....	1874	180	25			
	1875	119	22			
	1876	88	13	3		
	1877	83	12	2		
	1878	83	9	2	.....	Dunkin Act in force for 10 months.
	1879	93	12			
	1880	98	14			
	1881	105	15			
	1882	109	18			
	1883	108	16			
	1884	99	15			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	97	6			
	1889	102	6			
	1890	98	6			
	1891	97	6			
	1892	96	5			
	1893	97	5			
	1894	90	5			
	1895	90	5			
	1896	88	4			
	1897	87	4			
	1898	83	4			
	1899	81	4			
	1900	82	4			
	1901	81	4			
	1902	80	4			
	1903	80	4	1		
	1904	77	3	1		
	1905	74	3			
	1906	62	2			
	1907	55	2			
	1908	55	2			
	1909	56	2			
	1910	44	2			
	1911	41	2			
	1912	37	2			
	1913	29	.....			
	1914	25	.....			
	1915	24	.....			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Carleton (not including Ottawa).	1874	89	5			
	1875	79	8			
	1876	44	1	2		
	1877	55	3			
	1878	43	3			
	1879	43	1			
	1880	42	3			
	1881	50	3			
	1882	54	1			
	1883	58				
	1884	58	1			
	1885	55				
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	44	1			
	1890	44	1			
	1891	45				
	1892	46				
	1893	44				
	1894	45				
	1895	45				
	1896	44				
	1897	44				
	1898	46				
	1899	44				
	1900	44				
	1901	43				
	1902	43				
	1903	42				
	1904	42				
	1905	36				
	1906	27			Club	
	1907	25				
	1908	12				
	1909	10			1	
	1910	11			1	
	1911	11			1	
	1912	11			1	
	1913	7			1	
	1914	6			1	
	1915	6			1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Dufferin	1881	33	7	.....	.....	New County, erected 24th January, 1881.
	1882	33	5			
	1883	34	5			
	1884	34	4			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	24	2			
	1889	27	2			
	1890	26	2			
	1891	24	2			
	1892	24	2			
	1893	21	2			
	1894	21	2			
	1895	19	2			
	1896	19	2			
	1897	18	2			
	1898	15	2			
	1899	18	1			
	1900	18	1			
	1901	18	1			
	1902	17	1			
	1903	17	1			
	1904	17	1			
	1905	17	1			
	1906	15	1			
	1907	13	1			
	1908	12	1			
	1909	12	1			
	1910	3				
	1911	3				
	1912	2				
	1913	2				
	1914	.....	.....	.....	.....	All under Local Option.
	1915	.....	.....	.....	.....	"

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Elgin	1874	113	25			
	1875	110	24			
	1876	66	16			
	1877	66	10			
	1878	69	12			
	1879	72	16			
	1880	74	12			
	1881	74	13			
	1882	74	13			
	1883	74	16			
	1884	74	12			
	1885	71	10			
	1886	.....	.....	.....	.....	C. T. A. in Force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
Not including St. Thomas ..	1889	48	2			
" " ..	1890	44	1			
" " ..	1891	43	1			
" " ..	1892	44	1			
" " ..	1893	42	1			
" " ..	1894	41	1			
" " ..	1895	41	1			
" " ..	1896	39	1			
" " ..	1897	36	1			
" " ..	1898	35	1			
" " ..	1899	36	1			
" " ..	1900	36	1			
" " ..	1901	35	1			
" " ..	1902	36				
" " ..	1903	36				
" " ..	1904	36				
" " ..	1905	29				
" " ..	1906	23				
" " ..	1907	23				
" " ..	1908	23				
" " ..	1909	23				
" " ..	1910	21				
" " ..	1911	15				
" " ..	1912	12				
" " ..	1913	9				
" " ..	1914	6				
" " ..	1915	6				

SCHEDULE A.—Comparative statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Essex	1874	120	28	6		
	1875	101	25	6		
	1876	62	14	5	1	
	1877	69	18	1	1	
	1878	69	18	2	1	
	1879	71	18	3	1	
	1880	70	19	2	1	
	1881	74	21	2		
	1882	71	20	2		
	1883	74	19	2		
	1884	70	15	1		
	1885	77	13			
	1886	74	16			
	1887	84	15			
	1888	82	10			
	1889	95	12			
	1890	94	8			
Not including Windsor.....	1891	68	5			
" "	1892	71	5			
" "	1893	73	5			
" "	1894	70	6			
" "	1895	75	6			
" "	1896	72	6			
" "	1897	73	6			
" "	1898	72	6			
" "	1899	76	5	1		
" "	1900	83	5	1		
" "	1901	81	6	1		
" "	1902	84	6	1		
" "	1903	84	7	1		
" "	1904	84	8	1		
" "	1905	84	6			
" "	1906	80	6			
" "	1907	80	6			
" "	1908	76	7			
" "	1909	66	7			
" "	1910	51	5			
" "	1911	53	5		Club	
" "	1912	54	5			
" "	1913	53	5			
" "	1914	55	5		*2	*One for 1913–14
" "	1915	45	5		1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Frontenac (not including Kingston)	1874	71	2			
	1875	57	29			
	1876	29	.....	4		
	1877	17	.....	.....	.....	Dunkin Act assumed to be in force until quashed, December 28.
	1878	34				
	1879	36				
	1880	33	1			
	1881	33	1			
	1882	33	2			
	1883	36	2			
	1884	34	2			
	1885	34	1			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	23				
	1890	25				
	1891	23				
	1892	24				
	1893	22				
	1894	22				
	1895	24				
	1896	21				
	1897	33				
	1898	21				
	1899	22				
	1900	23				
	1901	23				
	1902	22				
	1903	22				
	1904	21				
	1905	21				
	1906	13				
	1907	10				
	1908	7				
	1909	7				
	1910	7				
	1911	5				
	1912	5				
	1913	4				
	1914	4				
	1915	.....				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Grey	1874	115	20	.....	3	
	1875	114	16	.....	2	
	1876	77	11	5	2	
	1877	.....	.....	6	2	Dunkin Act in force
	1878	72	7	4	1	Dunkin Act in force until September.
	1879	91	12	1	1	Melancthon and Shelburne attached to new County of Dufferin.
	1880	88	17	1	2	
	1881	84	16	.....	1	
	1882	88	18	.....	1	
	1883	95	20	.....	3	
	1884	91	19	.....	1	
	1885	92	18			
	1886	92	16	.....	3	
	1887	86	14	.....	3	
	1888	84	7	.....	4	
	1889	84	6	.....	1	
	1890	81	6			
	1891	75	5			
	1892	76	5			
	1893	77	5			
	1894	76	5			
	1895	76	5			
	1896	73	5			
	1897	72	3			
	1898	69	2			
	1899	66	2			
	1900	68	3			
	1901	68	2			
	1902	68	2			
	1903	67	2			
	1904	65	2			
	1905	62	2			
	1906	35				
	1907	31				
	1908	27				
	1909	26				
	1910	20				
	1911	20				
	1912	18				
	1913	18				
	1914	14				
	1915	13				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Haldimand	1874	96	16			
	1875	83	13			
	1876	45	5			
	1877	49	4			
	1878	49	4			
	1879	50	5			
	1880	47	5			
	1881	51	5			
	1882	52	5			
	1883	51	5			
	1884	47	5			
	1885	47	3			
	1886	48	4			
	1887	49	4			
	1888	43	4			
	1889	45	3			
	1890	49	3			
	1891	47	3			
	1892	47	3			
	1893	44	3			
	1894	42	3			
	1895	42	3			
	1896	42	4			
	1897	37	4			
	1898	36	4			
	1899	35	4			
	1900	35	4			
	1901	33	4			
	1902	32	4			
	1903	32	3			
	1904	32	3			
	1905	31	3			
	1906	30	3			
	1907	28	3			
	1908	27	2			
	1909	24	1			
	1910	24	1			
	1911	21	1			
	1912	21	1			
	1913	21	1			
	1914	21	1			
	1915	20	1			
Haliburton	1886	7				
	1887	6				
	1888	6				
	1889	7				
	1890	7				
	1891	8				
	1892	8				
	1893	8				
	1894	10				
	1895	8				
	1896	8				
	1897	7				
	1898	6				
	1899	6				
	1900	7				
	1901	7				
	1902	7				
	1903	7				
	1904	7				
	1905	6				
	1906	6				
	1907	6				
	1908	6				
	1909	6				
	1910	4				
	1911	4				
	1912	3				
	1913	3				
	1914	3				
	1915	3				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Halton	1874	61	4			
	1875	58	5			
	1876	39	2	1		
	1877	38	1			
	1878	38	1			
	1879	42	1			
	1880	41	1			
	1881	41	1			
	1882	.....	.....	.....	.....	C. T. A. in force.
	1883	.....	.....	.....	.....	" "
	1884	.....	.....	.....	.....	" "
	1885	.....	.....	.....	.....	" "
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	28				
	1889	28				
	1890	27				
	1891	27				
	1892	26				
	1893	27				
	1894	28				
	1895	28				
	1896	26				
	1897	23				
	1898	22				
	1899	22				
	1900	23				
	1901	21				
	1902	22				
	1903	20				
	1904	20				
	1905	19				
	1906	15				
	1907	17				
	1908	17				
	1909	16				
	1910	13			Club.	
	1911	13			1	
	1912	12			1	
	1913	14			1	
	1914	14			1	
	1915	14			1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Hastings	1874	117	23	1		
	1875	100	21	2		
	1876	76	11	3	1	
	1877	82	14	3	1	
	1878	89	15	3	2	
	1879	94	15	3	1	
	1880	91	16	3		
	1881	90	15	3		
	1882	95	13	3		
	1883	97	15	3		
	1884	90	14	3		
	1885	98	17	3		
	1886	104	16	2		
	1887	102	13	2		
	1888	96	13	3		
Not including Belleville	1889	73	9			
" "	1890	74	8			
" "	1891	74	8			
" "	1892	72	7			
" "	1893	70	7			
" "	1894	67	7			
" "	1895	68	8			
" "	1896	66	6			
" "	1897	67	7			
" "	1898	59	7			
" "	1899	57	8			
" "	1900	55	8			
" "	1901	56	9			
" "	1902	56	9			
" "	1903	55	9			
" "	1904	53	8			
" "	1905	49	7			
" "	1906	49	7			
" "	1907	46	7			
" "	1908	43	5			
" "	1909	31	4			
" "	1910	29	4			
" "	1911	29	3			
" "	1912	29	3			
" "	1913	28	3			
" "	1914	27	4			
" "	1915	26	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Huron	1874	150	38			
	1875	164	37	2		
	1876	113	16	3		
	1877	124	16			
	1878	127	20			
	1879	134	21			
	1880	131	16			
	1881	128	15			
	1882	124	15			
	1883	124	15			
	1884	111	14			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	108	11			
	1889	109	8			
	1890	103	5			
	1891	104	5			
	1892	102	5	1		
	1893	94	5	1		
	1894	92	5	1		
	1895	90	5	1		
	1896	88	6			
	1897	85	6			
	1898	83	6			
	1899	84	6			
	1900	82	6			
	1901	80	6			
	1902	79	6			
	1903	77	6			
	1904	76	5			
	1905	73	5			
	1906	72	5			
	1907	64	4			
	1908	62	4			
	1909	56	3			
	1910	47	3			
	1911	46	3			
	1912	43	3			
	1913	31	2			
	1914	.....	.....			
	1915	.....	.....	.....	.....	C. T. A. in force.

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Kent	1874	128	41	.....	1	
	1875	118	34	.....	1	
	1876	66	13	4	1	
	1877	67	15	.....	1	
	1878	65	13			
	1879	67	14			
	1880	67	13			
	1881	69	13	.....	1	
	1882	69	14	.....	1	
	1883	70	14			
	1884	75	11			
	1885	71	8			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	72	6			
	1890	75	6			
	1891	63	5			
	1892	61	4			
	1893	61	4			
	1894	61	4			
Not including Chatham	1895	44	2			
" "	1896	46	2			
" "	1897	43	3			
" "	1898	42	3			
" "	1899	42	3			
" "	1900	41	3			
" "	1901	41	3			
" "	1902	43	3			
" "	1903	41	3			
" "	1904	28	3			
" "	1905	27	3			
" "	1906	28	3			
" "	1907	29	3			
" "	1908	31	3			
" "	1909	31	3			
" "	1910	27	3			
" "	1911	25	3			
" "	1912	21	3			
" "	1913	21	3			
" "	1914	21	3			
" "	1915	19	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lambton	1874	89	44	1		
	1875	85	33			
	1876	65	28	1		
	1877	65	25			
	1878	70	27			
	1879	72	26			
	1880	71	25			
	1881	72	22			
	1882	75	22			
	1883	73	19			
	1884	74	16	1		
	1885	70	10	1		
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	65	9			
	1890	70	10			
	1891	64	6			
	1892	62	5			
	1893	64	5			
	1894	63	5			
	1895	61	5			
	1896	62	5			
	1897	62	4			
	1898	58	4			
	1899	58	4			
	1900	58	4			
	1901	59	4			
	1902	60	4			
	1903	61	4			
	1904	60	4			
	1905	58	3			
	1906	43	3			
	1907	42	3			
	1908	41	3			
	1909	39	3			
	1910	38	3			
	1911	37	3			
	1912	33	3			
	1913	30	3			
	1914	31	3			
Not including Sarnia	1915	22	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses	Wholesale licenses.	Vessel licenses.	Remarks.
Lanark	1874	62	20	2		
	1875	62	20	1		
	1876	32	9	2		
	1877	32	9			
	1878	7	4	.....	.....	Dunkin Act in force, except in Perth.
	1879	33	6			
	1880	34	8			
	1881	36	6			
	1882	36	7			
	1883	35	7			
	1884	36	7			
	1885	37	6			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	39	6			
	1890	45	7			
	1891	44	6			
	1892	44	7			
	1893	44	7			
	1894	44	6			
	1895	44	6			
	1896	44	6			
	1897	43	6			
	1898	43	6			
	1899	43	6			
	1900	44	6			
	1901	44	6			
	1902	45	6			
	1903	43	6			
	1904	42	6			
	1905	40	6			
	1906	37	3			
	1907	35	3			
	1908	35	3			
	1909	32	3			
	1910	22	3			
	1911	21	2			
	1912	22	2			
	1913	20	2			
	1914	18	2			
	1915	15	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Leeds and Grenville	1874	145	32	1		
	1875	136	23	1		
	1876	79	23	3		
	1877	101	25			
	1878	97	19			
	1879	97	18			
	1880	97	20	1		
	1881	89	18			
	1882	92	21			
	1883	94	21			
	1884	88	17			
	1885	77	17			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	73	13			
	1890	70	10			
	1891	69	10			
	1892	66	8			
	1893	67	7			
	1894	64	7			
	1895	65	7			
	1896	61	7			
	1897	57	7			
	1898	57	7	1		
	1899	58	8			
	1900	56	8			
	1901	58	8	.....	Clubs	
	1902	55	8			
	1903	57	8			
	1904	56	8			
	1905	36	6			
	1906	48	8	.....	1	
	1907	46	6	.....	1	
	1908	47	4	.....	2	
	1909	40	4	.....	2	
	1910	31	4	.....	2	
	1911	27	5	.....	2	
	1912	27	5	.....	2	
	1913	27	5	.....	2	
	1914	24	5	.....	2	
	1915	22	4	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lennox and Addington	1874	52	7	.....	1	
	1875	46	8			
	1876	28	6	1		
	1877	.....	.....	1	.....	Dunkin Act in force
	1878	36	6			
	1879	37	5			
	1880	37	5			
	1881	41	5			
	1882	43	6			
	1883	45	6			
	1884	44	5			
	1885	42	5			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	52	3			
	1890	49	2			
	1891	46	2			
	1892	47	2			
	1893	47	2			
	1894	44	1			
	1895	40	1			
	1896	37	1			
	1897	39	1			
	1898	37	1			
	1899	36	1			
	1900	35	1			
	1901	31	2			
	1902	34	2			
	1903	34	2			
	1904	34	2			
	1905	33	2			
	1906	33	2			
	1907	31	2			
	1908	31	2			
	1909	31	2			
	1910	29	2			
	1911	19	2			
	1912	19	2			
	1913	16	2			
	1914	16	2			
	1915	15	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lincoln (not including St. Catharines).	1874	94	23			
	1875	103	37			
	1876	70	31			
	1877	70	25			
	1878	69	21			
	1879	72	16			
	1880	73	12			
	1881	69	14			
	1882	73	15			
	1883	72	13			
	1884	71	11			
	1885	64	10			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	36	3			
	1890	36	3			
	1891	35	3			
	1892	34	1			
	1893	29	1			
	1894	28	1			
	1895	28	1			
	1896	27	1			
	1897	27	1			
	1898	27	1			
	1899	26	1			
	1900	26	1			
	1901	26	1			
	1902	26	1			
	1903	25	1			
	1904	21	1			
	1905	21	1			
	1906	13	1			
	1907	11	1			
	1908	11	1			
	1909	11	1			
	1910	14	1			
	1911	14	1			
	1912	14	1			
	1913	14	1			
	1914	14	1			
	1915	13	.....			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Middlesex (not including London).	1874	188	17	1		
	1875	174	33			
	1876	122	26	3		
	1877	139	23			
	1878	143	21			
	1879	141	19			
	1880	134	18			
	1881	138	18			
	1882	133	16			
	1883	130	18			
	1884	126	17			
	1885	128	16	.....	1	
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	82	8			
	1890	93	6			
	1891	93	5			
	1892	90	5			
	1893	80	4			
	1894	73	4			
	1895	69	4			
	1896	68	4			
	1897	67	4			
	1898	65	4			
	1899	67	4			
	1900	68	4			
	1901	67	4			
	1902	66	4			
	1903	63	2			
	1904	60	2			
	1905	56	1			
	1906	55				
	1907	49				
	1908	50			Club	
	1909	44				
	1910	25				
	1911	23				
	1912	20				
	1913	14			1	
	1914	14			1	
	1915	12			1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Muskoka and Parry Sound..	1874	9				
	1875	23				
	1876	19				
	1877	22				
	1878	29				
	1879	38	1			
	1880	44	4			
	1881	45	4			
	1882	48	5			
	1883	49	6			
	1884	48	4			
	1885	37	1			
	1886	23				
	1887	21				
	1888	32	1			
	1889	45	2			
	1890	47	1			
	1891	47	1			
	1892	53	1			
	1893	50	2			
	1894	56	2			
	1895	60	1			
	1896	60	1			
	1897	59	1			
	1898	58	1			
	1899	57	1			
	1900	59	1			
	1901	56	1			
	1902	58	1			
	1903	55	1			
	1904	52	1			
	1905	53	2			
	1906	53	2			
	1907	50	2			
	1908	45	2			
	1909	44	2			
	1910	46	2			
	1911	41	1			
	1912	38	1			
	1913	37	1			
	1914	36	1			
	1915	33	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks
Nipissing (including Temiskaming. Sturgeon Falls and Cochrane),	1878	2	1			
	1879	3	1			
	1880	3	1			
	1881	11	8			
	1882	8	5			
	1883	9	5			
	1884	5	5			
	1885	23	6			
	1886	22	4			
	1887	24	5			
	1888	23	4			
	1889	23	4			
	1890	27	4			
	1891	26	5			
	1892	30	6			
	1893	30	6			
	1894	28	5			
	1895	31	6			
	1896	34	6			
	1897	36	6			
	1898	34	5			
	1899	32	5			
	1900	34	5			
	1901	37	5			
	1902	39	5	Clubs.		
	1903	40	7			
	1904	43	8			
	1905	46	9			
	1906	56	8			
	1907	54	9			
	*1908	42	8			
	1909	43	8	2		
	1910	44	6	1		
	1911	42	6			
	1912	43	5			
	1913	42	5			
	1914	43	**7			
	1915	40	6			

* Apparent decrease is caused by re-arrangement of districts; increase of same number in Algoma.

** Including one for previous year.

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks
Norfolk	1874	73	6			
	1875	74	6			
	1876	51	4	2		
	1877	51	5	1		
	1878	55	5			
	1879	51	7			
	1880	51	6			
	1881	55	6			
	1882	56	6			
	1883	54	6			
	1884	51	4			
	1885	.....	.....	.....	.....	C. T. A. in force
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	37	4			
	1889	41	3			
	1890	39	2			
	1891	39	2			
	1892	41	2			
	1893	39	2			
	1894	35	2			
	1895	37	2			
	1896	31	2			
	1897	33	2			
	1898	32	2			
	1899	30	2			
	1900	29	2			
	1901	29	2			
	1902	29	2			
	1903	30	2			
	1904	29	2			
	1905	25	2			
	1906	22	2			
	1907	16	2			
	1908	17	2			
	1909	14	2			
	1910	15	2			
	1911	15	2			
	1912	13	1	.....	Club	
	1913	13	1	.....	1	
	1914	10	1	.....	1	
	1915	10	1	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Continued

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Northumberland & Durham.	1874	135	35	2	1	
	1875	121	32	2	1	
	1876	102	27	4	1	
	1877	103	25	2	1	
	1878	89	21	2	2	Dunkin Act in force for ten months except in Port Hope and Cobourg.
	1879	98	21	.....	1	
	1880	100	22	.....	1	
	1881	100	23	.....	1	
	1882	102	23	.....	1	
	1883	104	23	.....	1	
	1884	101	19			
	1885	97	16			
	1886	.....	.....	.....	.....	C. T. A. in force
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	81	14			
	1890	74	13			
	1891	77	15			
	1892	76	14			
	1893	75	10			
	1894	68	9			
	1895	66	8			
	1896	64	9			
	1897	61	7			
	1898	59	7			
	1899	57	7			
	1900	55	7			
	1901	56	7			
	1902	56	7			
	1903	55	7			
	1904	53	7			
	1905	50	7			
	1906	48	6			
	1907	44	5			
	1908	26	4			
	1909	23	4			
	1910	23	4			
	1911	23	4			
	1912	21	4			
	1913	21	4			
	1914	20	3			
	1915	19	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Ontario.....	1874	86	35			
	1875	87	23			
	1876	60	10			
	1877	58	9			
	1878	55	8	2	.....	Dunkin Act in force for ten months.
	1879	61	9			
	1880	65	11			
	1881	66	12			
	1882	71	13			
	1883	72	12			
	1884	68	11			
	1885	67	12			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	64	7			
	1890	62	7			
	1891	60	4			
	1892	57	6			
	1893	50	5			
	1894	47	4			
	1895	45	4			
	1896	44	4			
	1897	50	4			
	1898	49	4			
	1899	45	4			
	1900	46	4			
	1901	46	4			
	1902	46	4			
	1903	44	4			
	1904	41	3			
	1905	42	3			
	1906	32	3			
	1907	31	3			
	1908	30	3			
	1909	30	3			
	1910	25	3			
	1911	22	3			
	1912	20	3			
	1913	15	3			
	1914	14	3			
	1915	13	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Oxford	1874	104	39			
	1875	102	25			
	1876	73	9	4		
	1877	70	10	1		
	1878	71	10			
	1879	74	12			
	1880	74	14			
	1881	73	13			
	1882	74	11			
	1883	72	9			
	1884	62	8			
	1885	.....	.....	.....	.....	C.T.A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	52	6	1		
	1890	58	7	1		
	1891	57	5	1		
	1892	50	5			
	1893	50	6			
	1894	48	6			
	1895	48	5			
	1896	47	5			
	1897	47	5			
	1898	47	5			
	1899	47	5			
	1900	47	5			
	1901	47	5			
	1902	45	5			
Not including Woodstock	1903	33	3			
" " "	1904	31	3			
" " "	1905	28	3			
" " "	1906	24	3			
" " "	1907	22	2			
" " "	1908	19	2			
" " "	1909	20	3			
" " "	1910	16	3			
" " "	1911	16	3			
" " "	1912	13	3			
" " "	1913	7	2			
" " "	1914	7	2			
" " "	1915	7	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Peel	1874	91	15			
	1875	86	15			
	1876	49	10			
	1877	57	9			
	1878	60	8			
	1879	57	7			
	1880	62	7			
	1881	56	7			
	1882	57	6			
	1883	57	5			
	1884	55	4			
	1885	58	4			
	1886	55	5			
	1887	56	4			
	1888	57	3			
	1889	52	3			
	1890	52	3			
	1891	51	3			
	1892	47	3			
	1893	48	2			
	1894	47	2			
	1895	46	2			
	1896	47	2			
	1897	47	2			
	1898	42	2			
	1899	40	2			
	1900	42	2			
	1901	40	2			
	1902	39	2			
	1903	39	1			
	1904	41	1			
	1905	25				
	1906	24				
	1907	20			Clubs.	
	1908	20				
	1909	20	.....	.....	2	
	1910	8	.....	.....	2	
	1911	8	.....	.....	3	
	1912	8	.....	.....	2	
	1913	8	.....	.....	3	
	1914	.....	.....	.....	.....	
	1915	.....	.....	.....	.....	C.T.A. in Force.

SCHEDULE A.—Comparative Statement, etc. -Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Perth.....	1874	145	23			
	1875	135	25			
	1876	101	13	3		
	1877	105	17			
	1878	105	17			
	1879	110	18			
	1880	110	19			
	1881	106	19			
	1882	110	19			
	1883	109	17			
	1884	102	14			
	1885	93	14			
	1886	95	12			
	1887	95	13			
	1888	96	10			
Not including Stratford	1889	74	5			
" "	1890	72	5			
" "	1891	69	4			
" "	1892	68	5			
" "	1893	65	6			
" "	1894	62	5			
" "	1895	61	5			
" "	1896	58	5			
" "	1897	59	5			
" "	1898	57	5			
" "	1899	55	5			
" "	1900	53	6			
" "	1901	53	6			
" "	1902	54	6			
" "	1903	53	6			
" "	1904	48	6			
" "	1905	48	6			
" "	1906	40	6			
" "	1907	44	6			
" "	1908	46	6			
" "	1909	43	4			
" "	1910	40	4			
" "	1911	40	3			
" "	1912	38	3			
" "	1913	31	3			
" "	1914	29	3			
" "	1915	29	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Peterborough	1874	98	16			
	1875	72	16			
	1876	40	11	2	1	
	1877	43	11	.....	1	
	1878	35	11	.....	1	Dunkin Act in force in part of West Riding for 10 months.
	1879	42	13	.....	1	
	1880	46	12	.....	1	
	1881	46	14	.....	1	
	1882	50	15	.....	1	
	1883	50	14	.....	1	
	1884	46	13	.....	1	
	1885	43	12			
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	43	10	.....	1	
	1890	41	11			
	1891	45	9			
	1892	46	8			
	1893	43				
	1894	39				
	1895	47	6			
	1896	47	6			
	1897	43	6			
	1898	40	6			
	1899	38	6	1		
	1900	38	5	1		
	1901	38	5	1		
	1902	37	5	1		
	1903	37	6	1		
	1904	37	6	1		
	1905	33	5	1		
Not including City of Peterborough	1906	27	4			
" " "	1907	6				
" " "	1908	5				
" " "	1909	2				
" " "	1910	2				
" " "	1911	2				
" " "	1912	2				
" " "	1913	1				
" " "	1914	1				
" " "	1915	1				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Prescott and Russell	1874	63	10	1		
	1875	58	11			
	1876	52				
	1877	46	5			
	1878	49	5			
	1879	41	5			
	1880	42	4			
	1881	50	5			
	1882	53	6			
	1883	62	7			
	1884	65	4			
	1885	65	3			
	1886	68	1			
	1887	78	1			
	1888	76	1			
	1889	76	1			
	1890	78	2			
	1891	75	3			
	1892	77	2			
	1893	72	2			
	1894	69	3			
	1895	71	3			
	1896	76	3			
	1897	76	4			
	1898	72	4			
	1899	74	4			
	1900	76	4			
	1901	77	5			
	1902	78	5			
	1903	77	5			
	1904	75	5			
	1905	76	4			
	1906	77	4			
	1907	69	4			
	1908	71	3			
	1909	72	3			
	1910	66	3			
	1911	61	2			
	1912	59	1			
	1913	56	2			
	1914	56	2			
	1915	55	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Prince Edward	1874	22	3	.....	3	
	1875	33	3	.....	1	
	1876	.....	.....	1	1	Dunkin Act in force
	1877	.....	.....	.....	.....	" "
	1878	.....	.....	.....	.....	" "
	1879	23	2	.....	1	
	1880	24	2	.....	3	
	1881	24	3	.....	1	
	1882	22	3	.....	2	
	1883	23	4	.....	2	
	1884	21	1	.....	2	
	1885	23	2	.....	2	
	1886	24	2			
	1887	21	2	.....	2	
	1888	18	2			
	1889	16	2			
	1890	18	2			
	1891	18	2			
	1892	17	2			
	1893	16	2			
	1894	15	2			
	1895	15	2			
	1896	14	2			
	1897	13	2			
	1898	13	2			
	1899	12	2			
	1900	12	2			
	1901	12	2			
	1902	12	2			
	1903	13	1			
	1904	12	1			
	1905	11	1			
	1906	9	1			
	1907	9	1			
	1908	9	1			
	1909	5	1			
	1910	6	1			
	1911	6	1			
	1912	5	1			
	1913	5	1			
	1914	5	1			
	1915	6	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Renfrew	1874	100	35	.....	1	
	1875	102	30	1	1	
	1876	51	20	.....	1	
	1877	42	17			
	1878	31	15			
	1879	36	16			
	1880	42	21			
	1881	47	17			
	1882	48	23			
	1883	63	30			
	1884	44	20			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	55	12			
	1889	55	16			
	1890	56	16			
	1891	55	13			
	1892	58	14			
	1893	60	13			
	1894	66	15			
	1895	65	17			
	1896	63	16			
	1897	62	14			
	1898	58	14			
	1899	60	14			
	1900	60	14			
	1901	60	14			
	1902	59	15			
	1903	59	10			
	1904	58	10			
	1905	56	10			
	1906	57	9			
	1907	56	9			
	1908	52	9			
	1909	46	8			
	1910	35	6			
	1911	34	6			
	1912	32	6			
	1913	30	6			
	1914	26	4			
	1915	25	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Simcoe.....	1874	223	42			
	1875	196	35	2	2	
	1876	135	24	2	2	
	1877	137	24	1	2	
	1878	149	21	1	1	
	1879	142	20	1	1	
	1880	155	23	1	1	
	1881	144	23	1	1	Mono and Mulmur attached to new County of Dufferin.
	1882	146	23			
	1883	147	26			
	1884	138	24			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	121	17			
	1889	134	18			
	1890	123	17			
	1891	113	15			
	1892	117	12			
	1893	113	11			
	1894	106	11			
	1895	105	11			
	1896	102	10			
	1897	100	9			
	1898	97	9			
	1899	95	9			
	1900	97	8			
	1901	96	8			
	1902	95	8			
	1903	90	8			
	1904	88	8			
	1905	84	8			
	1906	81	7			
	1907	69	6			
	1908	54	6			
	1909	51	5			
	1910	24	2			
	1911	24	2			
	1912	23	2			
	1913	21	2			
	1914	21	2			
	1915	17	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licen s.	Vessel licenses.	Remarks.
Stormont, Dundas and Glengarry.	1874	122	31			
	1875	80	28			
	1876	82	22			
	1877	87	17			
	1878	94	17			
	1879	91	16			
	1880	91	18			
	1881	96	18			
	1882	95	18			
	1883	89	17			
	1884	92	15			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	105	8			
	1889	111	10			
	1890	103	8			
	1891	96	10			
	1892	94	10			
	1893	84	8			
	1894	82	8	1		
	1895	80	4			
	1896	79	4			
	1897	78	4			
	1898	74	3	1		
	1899	75	3			
	1900	73	2			
	1901	74	2			
	1902	73	2			
	1903	71	2			
	1904	72	3			
	1905	64	4			
	1906	54	2			
	1907	54	2			
	1908	53	2			
	1909	40	2			
	1910	38	2			
	1911	21	2			
	1912	20	3			
	1913	19	3			
	1914	18	3			
	1915	18	3			

District.	Year.	Tavern licenses.	Shop licenses.	Club licenses.	Remarks.
Thunder Bay (including Kenora, Fort William, Port Arthur and Rainy River, but not including the cities of Fort William and Port Arthur).	1914	35	7	1	
	1915	33	7	1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Victoria	1874	78	13	1		
	1875	70	9	.....	1	
	1876	55	5	1	.....	
	1877	56	5	.....	.....	
	1878	56	6	.....	.....	
	1879	60	6	.....	.....	
	1880	59	5	.....	.....	Including Haliburton.
	1881	62	4	.....	.....	
	1882	62	3	.....	1	
	1883	62	3	.....		
	1884	58	3	.....	.....	
	1885	54	3			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	46	2			
	1890	44	2			
	1891	47	2			
	1892	40	3			
	1893	39	3			
	1894	38	3			
	1895	33	2			
	1896	33	2			
	1897	33	1			
	1898	32	1			
	1899	29	1			
	1900	29	1			
	1901	30	1			
	1902	30	1			
	1903	26	1			
	1904	25	1			
	1905	26	1			
	1906	25	1			
	1907	24	1			
	1908	15	1			
	1909	15	1			
	1910	13	1			
	1911	13	1			
	1912	13	1			
	1913	13	1			
	1914	12	1			
	1915	12	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Re marks.
Waterloo	1874	136	21			
	1875	136	20	3		
	1876	86	19	13		
	1877	84	17	10		
	1878	87	17			
	1879	89	15			
	1880	87	15			
	1881	88	16			
	1882	90	17			
	1883	91	15		1	
	1884	92	14			
	1885	90	13			
	1886	87	12			
	1887	87	12			
	1888	90	9	1		
	1889	91	10	1		
	1890	92	10	1		
	1891	91	10	1		
	1892	90	11	1		
	1893	90	10	1		
	1894	88	10	1		
	1895	89	10	3		
	1896	90	10	5		
	1897	88	10	3		
	1898	86	10	2		
	1899	85	11	2		
	1900	86	10	2		
	1901	85	10	2		
	1902	85	8	1		
	1903	81	8	1		
	1904	80	10	1		
	1905	78	10		Clubs.	
	1906	78	10			
	1907	76	10			
	1908	76	10		1	
	1909	75	10		1	
	1910	68	8		1	
	1911	67	7		1	
	1912	67	7		2	
	1913	67	7		4	
	1914	57	5		3	
Not including Kitchener	1915	56	5		2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Welland.....	1874	145	28	3		
	1875	151	23			
	1876	73	19			
	1877	80	19			
	1878	89	21			
	1879	92	25			
	1880	87	29			
	1881	81	19			
	1882	78	20			
	1883	79	18			
	1884	82	14			
	1885	79	15			
	1886	82	12			
	1887	78	10			
	1888	70	8			
	1889	73	9			
	1890	73	9			
	1891	70	9			
	1892	71	9			
	1893	66	10			
	1894	64	10			
	1895	66	10			
	1896	65	9			
	1897	63	9			
	1898	62	9			
	1899	60	9			
	1900	64	9			
	1901	65	10			
	1902	64	10			
	1903	61	10			
	1904	61	10			
	1905	59	10			
	1906	64	10			
	1907	65	10			
	1908	64	10			
	1909	59	10		Clubs.	
	1910	60	10		1	
	1911	55	10		1	
	1912	54	11		3	
	1913	53	11		2	
	1914	51	11		2	
	1915	49	11		2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Wellington	1874	183	52			
	1875	182	41	3		
	1876	138	29	3		
	1877	130	28	3		
	1878	134	29			
	1879	138	29			
	1880	145	30			
	1881	134	24	.....	.....	Orangeville, Amaranth and East Garafraxa attached to new County of Dufferin.
	1882	128	26			
	1883	126	22			
	1884	116	19			
	1885	104	13			
	1886	.....	.....	.....	.....	C. T. A. in force
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
Not including Guelph.....	1889	78	5			
" "	1890	77	4			
" "	1891	80	3			
" "	1892	79	3			
" "	1893	76	2			
" "	1894	72	2			
" "	1895	71	1			
" "	1896	71	1			
" "	1897	68	1			
" "	1898	64	1			
" "	1899	63	1			
" "	1900	62	1			
" "	1901	62	1			
" "	1902	61	1			
" "	1903	58	1			
" "	1904	57				
" "	1905	49				
" "	1906	44				
" "	1907	42				
" "	1908	39				
" "	1909	39				
" "	1910	35				
" "	1911	33	1			
" "	1912	31	1			
" "	1913	29	1			
" "	1914	26	1			
" "	1915	26	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Wentworth (not including Hamilton).	1874	110	32	4		
	1875	107	19	2		
	1876	61	11	2		
	1877	56	10			
	1878	47	6			
	1879	63	6			
	1880	56	6			
	1881	55	6			
	1882	51	6			
	1883	52	6			
	1884	54	6			
	1885	54	6			
	1886	49	6			
	1887	51	5			
	1888	47	4			
	1889	49	3			
	1890	49	4			
	1891	49	3			
	1892	46	3			
	1893	45	3			
	1894	42	3			
	1895	41	3			
	1896	38	3			
	1897	38	3			
	1898	39	3			
	1899	39	3			
	1900	39	3			
	1901	39	3			
	1902	37	3		Clubs.	
	1903	34	3			
	1904	34	3			
	1905	35	1			
	1906	33	1		1	
	1907	30	1		2	
	1908	22	1		2	
	1909	21	1		2	
	1910	17	1		2	
	1911	16	1		2	
	1912	15	1		3	
	1913	15	1		3	
	1914	13	1		3	
	1915	13	1		5	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
York (not including Toronto).	1874	148	39			
	1875	164	35			
	1876	108	16	1		
	1877	97	15			
	1878	.....	.....	.....		Dunkin Act in force
	1879	114	15	.....		Dunkin Act in force one month, May.
	1880	117	16			
	1881	128	21			
	1882	131	24			
	1883	132	23			
	1884	121	13			
	1885	114	12			
	1886	116	10			
	1887	109	7			
	1888	107	2			
	1889	112	1			
	1890	108	2			
	1891	105	3			
	1892	108	4			
	1893	104	4			
	1894	103	4			
	1895	102	4			
	1896	100	4			
	1897	100	4			
	1898	98	4			
	1899	97	2			
	1900	92	2			
	1901	92	2	1		
	1902	92	2	1		
	1903	91	2	1		
	1904	84	1	1		
	1905	73	1		Clubs.	
	1906	54	1			
	1907	50	1		2	
	1908	51	1		4	
	1909	46	1		4	
	1910	36			3	
	1911	33			3	
	1912	33			3	
	1913	28			4	
	1914	27			3	
	1915	25			4	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Toronto	1874	309	184	21	16	
	1875	299	128	28	9	
	1876	216	100	39	9	
	1877	182	100	26	6	
	1878	181	92	20	10	
	1879	195	88	19	6	
	1880	204	94	18	4	
	1881	210	95	15	6	
	1882	216	100	14	7	
	1883	197	98	14	5	
	1884	217	88	13	3	
	1885	227	71	*14	2	
	1886	224	66	13	3	
	1887	150	50	13	1	
	1888	150	50	12	3	
	1889	150	50	14	3	
	1890	150	50	11		
	1891	150	50	11		
	1892	150	50	10		
	1893	149	50	10		
	1894	150	50	11		
	1895	150	50	8		
	1896	150	50	9		
	1897	150	50	6		
	1898	150	50	6		
	1899	150	50	6		
	1900	150	50	5		
	1901	150	50	7		
	1902	150	50	5		
	1903	150	50	6		
	1904	150	50	8	Clubs.	
	1905	147	50	11	12	
	1906	146	50		15	
	1907	144	50		14	
	1908	144	50		20	
	1909	110	50		21	
	1910	110	50		20	
	1911	110	50		21	
	1912	110	50		20	
	1913	110	50		20	
	1914	109	50		17	
	1915	107	50			

* Dominion issues.

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Hamilton	1874	127	93	.....	3	
	1875	110	72			
	1876	68	61	11	1	
	1877	68	55	7	2	
	1878	68	64	7	2	
	1879	68	61	8		
	1880	74	57	7		
	1881	89	55	7		
	1882	98	58	8		
	1883	105	54	8		
	1884	97	47	4		
	1885	110	48	3		
	1886	112	45	5		
	1887	107	40	4		
	1888	111	37	2		
	1889	91	38	3		
	1890	92	38	3		
	1891	91	37	3		
	1892	94	34	3		
	1893	94	30	3		
	1894	75	20	4		
	1895	75	20	4		
	1896	76	20	4		
	1897	75	20	3		
	1898	75	20	2		
	1899	75	20	2	Clubs.	
	1900	75	19	3		
	1901	75	19	3		
	1902	75	19	3		
	1903	75	19	3		
	1904	73	18	3		
	1905	68	17	5		
	1906	68	17		2	
	1907	68	17		3	
	1908	69	17		3	
	1909	66	16		3	
	1910	67	16		3	
	1911	58	15		3	
	1912	58	15		3	
	1913	58	16		3	
	1914	57	16		3	
	1915	55	16		3	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Ottawa.....	1874	120	77	6		
	1875	114	148	6		
	1876	75	77	7	1	
	1877	75	80	2	1	
	1878	73	77	.....	1	
	1879	73	71	.....	1	
	1880	75	72	.....	1	
	1881	75	77	.....	1	
	1882	75	76	.....	1	
	1883	75	84	.....	1	
	1884	75	78	.....	1	
	1885	75	77			
	1886	75	69	1		
	1887	75	68	1	1 B. & W.	
	1888	76	54	2	1	
	1889	80	56	1	1B.& W.	
	1890	88	59	2		
	1891	87	59	1		
	1892	78	46	1		
	1893	72	40	5		
	1894	71	38	5		
	1895	70	33	3		
	1896	76	33	4		
	1897	77	33	5		
	1898	80	33	6		
	1899	78	32	7		
	1900	75	32	9		
	1901	76	32	8		
	1902	76	32	7		
	1903	77	31	6	Clubs.	
	1904	67	31	5		
	1905	67	31	5		
	1906	67	31		3	
	1907	65	31		3	
	1908	65	26		3	
	1909	64	24		3	
	1910	55	20		4	
	1911	55	20		4	
	1912	55	20		4	
	1913	54	20		4	
	1914	50	20		4	
	1915	48	20		4	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
London.....	1874	75	40	3		
	1875	75	74	2		
	1876	57	34	5		
	1877	58	35	1		
	1878	58	37	1		
	1879	57	36	2		
	1880	45	27	2		
	1881	45	24	2		
	1882	47	26	3		
	1883	47	24	2		
	1884	48	22	2		
	1885	49	23	1		
	1886	61	21	2		
	1887	54	19	2		
	1888	57	14	1		
	1889	58	13	1		
	1890	56	12	1		
	1891	41	10	1		
	1892	34	6	3		
	1893	34	6	5		
	1894	34	6	2		
	1895	35	6	2		
	1896	34	6	2		
	1897	34	6	2		
	1898	34	6	2		
	1899	34	6	2	Clubs.	
	1900	35	6	2		
	1901	35	6	2		
	1902	35	6	2		
	1903	35	6	1		
	1904	35	6	1		
	1905	32	5	1		
	1906	26	5		1	
	1907	26	5		2	
	1908	26	5		2	
	1909	26	5		2	
	1910	26	5		2	
	1911	26	5		2	
	1912	26	5		2	
	1913	26	5		2	
	1914	26	5		2	
	1915	22	5		2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Kingston	1874	97	25	.....	1	
	1875	75	20	3	1	
	1876	53	23	6	5	
	1877	61	21	3	8	
	1878	61	21	3	8	
	1879	62	20	3	8	
	1880	62	20	3	8	
	1881	64	20	2	11	
	1882	53	22	2	9	
	1883	53	23	3	6	
	1884	39	20	2	6	
	1885	38	22	1	4	
	1886	41	22	1	6	
	1887	43	20	1	6	
	1888	44	15	1	7	
	1889	40	15	1		
	1890	38	15	1		
	1891	39	15	1		
	1892	41	15	1		
	1893	40	14	1		
	1894	38	13	1		
	1895	39	12			
	1896	37	12			
	1897	37	12			
	1898	36	12			
	1899	34	11			
	1900	34	11			
	1901	34	10			
	1902	34	10			
	1903	33	10	.....	Clubs.	
	1904	33	8			
	1905	33	7			
	1906	31	7			
	1907	28	7			
	1908	28	7		2	
	1909	28	7		1	
	1910	25	6		1	
	1911	25	6		1	
	1912	15	6		1	
	1913	15	6		1	
	1914	15	6		1	
	1915	15	6		1	
St. Catharines	1886	26	7			
	1887	29	7			
	1888	23	7			
	1889	26	6			
	1890	26	5			
	1891	26	4			
	1892	26	3			
	1893	26	3			
	1894	26	3			
	1895	26	3			
	1896	26	2			
	1897	26	2			
	1898	22	2			
	1899	24	2			
	1900	22	2			
	1901	21	2			
	1902	24	2	.....	Clubs.	
	1903	19	2			
	1904	19	2			
	1905	18	2			
	1906	19	2		1	
	1907	19	2		1	
	1908	19	2		1	
	1909	16	2		1	
	1910	10	2		1	
	1911	10	2		1	
	1912	10	2		1	
	1913	10	2		1	
	1914	10	2		1	
	1915	10	2		1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Brantford	1886	19	5	3		
	1887	18	5	3		
	1888	18	5	3		
	1889	18	5	3		
	1890	18	5	2		
	1891	18	5	1		
	1892	18	5	1		
	1893	18	5	1		
	1894	18	5	1		
	1895	16	5	1		
	1896	16	5	1		
	1897	16	5	.....	1	
	1898	16	4			
	1899	16	4			
	1900	17	4			
	1901	17	4			
	1902	16	4			
	1903	17	4	.....	Clubs	
	1904	16	4			
	1905	17	4			
	1906	16	4			
	1907	16	4		1	
	1908	16	4		1	
	1909	16	4		1	
	1910	9	3		1	
	1911	9	3		1	
	1912	9	3		1	
	1913	9	3		1	
	1914	9	3		1	
	1915	9	3		1	
St. Thomas	1889	20	6			
	1890	18	4			
	1891	18	4			
	1892	18	4			
	1893	18	4			
	1894	18	4			
	1895	18	4			
	1896	18	4			
	1897	18	3			
	1898	17	3			
	1899	17	4			
	1900	17	3			
	1901	17	2			
	1902	17	3			
	1903	17	3			
	1904	17	3			
	1905	16	3			
	1906	16	3			
	1907	16	3			
	1908	16	3			
	1909	16	3			
	1910	16	3			
	1911	16	3			
	1912	16	3			
	1913	13	3			
	1914	13	3			
	1915	13	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Stratford.....	1889	21	4			
	1890	21	4			
	1891	21	4			
	1892	21	4			
	1893	19	4			
	1894	16	2			
	1895	16	2			
	1896	16	2			
	1897	16	2			
	1898	16	2			
	1899	16	2			
	1900	16	2			
	1901	16	2			
	1902	16	2			
	1903	15	2			
	1904	15	2			
	1905	13	2			
	1906	15	2			
	1907	16	2			
	1908	16	2			
	1909	15	2			
	1910	16	2			
	1911	15	2			
	1912	10	2			
	1913	10	2			
	1914	10	2			
	1915	10	2			
Guelph	1889	16	2			
	1890	16	2			
	1891	16	2			
	1892	16	2			
	1893	16	2			
	1894	16	2			
	1895	16	2			
	1896	16	2			
	1897	16	2			
	1898	16	2			
	1899	16	2			
	1900	14	2			
	1901	15	2			
	1902	15	2			
	1903	15	2			
	1904	15	2		Clubs.	
	1905	15	2			
	1906	15	2		1	
	1907	15	2		1	
	1908	15	2		1	
	1909	15	2		1	
	1910	14	2		1	
	1911	13	2		1	
	1912	14	2		1	
	1913	13	2		1	
	1914	13	2		1	
	1915	13	2		1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Belleville	1889	25	3	2		
	1890	25	3	2		
	1891	25	3	2		
	1892	25	3	2		
	1893	24	3	2		
	1894	24	3	2		
	1895	25	3	2		
	1896	26	3	1		
	1897	26	3	1		
	1898	21	2	1		
	1899	17	2			
	1900	18	2			
	1901	18	2			
	1902	18	2			
	1903	17	2			
	1904	16	3			
	1905	16	3			
	1906	16	3			
	1907	16	3			
	1908	16	3			
	1909	16	3			
	1910	16	3			
	1911	15	3			
	1912	15	3			
	1913	15	3			
	1914	14	3			
	1915	14	3	1		
Windsor	1891	22	4			
	1892	25	5			
	1893	27	4			
	1894	27	4			
	1895	27	4			
	1896	27	4			
	1897	27	3	1		
	1898	24	3	1		
	1899	22	3			
	1900	21	3			
	1901	23	3			
	1902	23	3			
	1903	23	3			
	1904	23	3			
	1905	19	3			
	1906	23	3			
	1907	23	3			
	1908	23	3			
	1909	23	3			
	1910	23	3			
	1911	23	3		Club 1	
	1912	22	3		2	
	1913	21	3		2	
	1914	21	3		4	One for previous year.
	1915	19	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Chatham	1895	17	2			
	1896	18	2			
	1897	17	2			
	1898	16	2			
	1899	15	2			
	1900	15	2			
	1901	15	2			
	1902	15	2			
	1903	15	2			
	1904	15	2			
	1905	12	2			
	1906	13	2			
	1907	13	2			
	1908	14	2			
	1909	14	2			
	1910	13	2			
	1911	13	2			
	1912	13	2		Club.	
	1913	13	2		1	
	1914	13	2		1	
	1915	13	2		1	
Woodstock	1903	12	2			
	1904	12	2			
	1905	9	2			
	1906	9	2			
	1907	8	2			
	1908	9	2			
	1909	9	2			
	1910	7	2			
	1911	7	2			
	1912	7	2			
	1913	6	2			
	1914	6	2			
	1915	6	2			
Peterborough	1907	20	4	.....	Club. 1	
	1908	19	4	.....	1	
	1909	18	4	....	1	
	1910	12	3	.....	1	
	1911	12	3	.....	1	
	1912	12	3	.....	1	
	1913	11	3	.....	1	
	1914	11	3	.....	1	
	1915	11	3	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern Licenses.	Shop licenses.	Club licenses.	Remarks.
Fort William	1914	13	3	1	
do	1915	12	3	1	
Port Arthur	1914	16	2	1	
do	1915	16	2	3	
Sault Ste. Marie	1914	13	.....	1	
do do	1915	13	.....	1	
Berlin	1914	9	2	1	
Kitchener	1915	9	2	1	
Sarnia	1915	10	2	.....	

SCHEDULE A.—Comparative Statement, etc.—Concluded.

RECAPITULATION, showing the total number of Provincial licenses issued in the several counties in the province, including the cities, during the license years 1874-5-6-7-8-9-80-1-2 3-4-5-6-7-8-9-90-1-2-3-4-5-6-7-8-9-1900-1-2-3-4-5-6-7-8-9-10-11-12-13-14-15.

Years.	Tavern.	Shop.	Wholesale.	Vessel.	Club.	Total.
1874	4,793	1,307	52	33	.....	6,185
1875	4,459	1,257	78	24	.....	5,818
1876	2,977	787	147	27	.....	3,938
1877	2,845	739	65	27	.....	3,676
1878	2,910	724	52	29	.....	3,715
1879	3,199	757	42	22	.....	4,020
1880	3,227	760	40	22	.....	4,049
1881	3,311	764	34	24	.....	4,133
1882	3,317	787	35	24	.....	4,163
1883	3,363	781	36	21	.....	4,201
1884	3,253	675	28	14	.....	3,970
1885	2,574	525	24	9	.....	3,132
1886	1,567	367	28	12	.....	1,974
1887	1,496	325	28	13	.....	1,862
1888	2,066	336	26	17	.....	2,445
1889	3,073	445	37	15	.....	3,560
1890	3,071	428	24	.....	.....	3,523
1891	2,990	403	21	.....	.....	3,414
1892	2,966	378	25	.....	.....	3,369
1893	2,888	357	31	.....	.....	3,276
1894	2,785	337	29	.....	.....	3,151
1895	2,779	327	26	.....	.....	3,132
1896	2,747	323	26	.....	.....	3,096
1897	2,725	317	22	.....	.....	3,064
1898	2,641	312	23	.....	.....	2,976
1899	2,611	308	21	.....	.....	2,950
1900	2,621	303	24	.....	.....	2,948
1901	2,613	308	26	.....	.....	2,947
1902	2,628	307	22	.....	.....	2,957
1903	2,577	300	22	.....	.....	2,899
1904	2,516	298	22	.....	.....	2,836
1905	2,384	283	24	.....	.....	2,691
1906	2,207	267	23	.....	24	2,521
1907	2,110	262	25	.....	35	2,432
1908	2,010	253	23	.....	42	2,328
1909	1,873	245	32*	.....	50	2,200
1010	1,630	226	31*	.....	51	1,938
1911	1,537	221	30	.....	52	1,841
1912	1,469	219	29	.....	57	1,774
1913	1,371	218	28	.....	63	1,680
1914	1,285	216	31	.....	61	1,593
1915	1,224	211	30	.....	64	1,529

The Six Months' Licenses and the Licenses *extended* do not appear in the above Schedule or recapitulation. Beer and Wine Licenses are included with the ordinary licenses, under the heads of Tavern Licenses and Vessel Licenses, respectively. An *extended* License is good for a period not exceeding three months. It is not in the nature of a new License, but simply a permission, granted by the Board of Commissioners to the holder of a License expiring in April, to continue his business under the old license for the specified period, that he may be able to dispose of his stock on hand and quit the business without loss. Six Months' Licenses run from the first day of May to the thirty-first day of October, and are not valid after the latter date. They are granted to localities which are largely resorted to in summer by visitors, where the Board of Commissioners is of the opinion that increased tavern accommodation for the summer months is necessary.

* A change in the Act, compelling firms outside of the Province to take out a License to sell to the trade in Ontario, is the cause of the increase. Eleven Wholesale Licenses were issued to firms and chartered companies, who formerly sold to the trade in Ontario without having to procure a license in this Province.

SCHEDULE B.

SCHEDULE B.

STATEMENT BY MUNICIPALITIES, showing the number of Provincial Licenses, whether ordinary, Beer and Wine, or Club, issued; the number extended or transferred; number of bartenders' licenses Issued; the sums deposited to the credit of the License Fund Accounts for licenses only; the revenue paid over to the Municipal treasurers, and the amounts received by the Province from licenses for the license year 1915–16.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Addington ...	*Newburg, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Camden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sheffield	5	.....	.....	.....	.....	5	.....	.....	.....	.....	600 00	135 00	135 00
	Kaladar and Anglesea	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	27 00	27 00
	Barrie	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	27 00	27 00
	*Kennebec	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Olden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Oso	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hinchinbrooke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Palmerston and Canonto	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Clarendon and Millar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Abinger, Ashby and Denbigh	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Grant from Government	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	225 00	.....	.....
	Transferred from Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	152 67	.....	.....
	Totals	7	.....	.....	.....	.....	7	.....	.....	.....	.....	1,217 67	189 00	189 00

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Algoma	St. Joseph	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hilton	1	.....	.....	.....	.....	1	.....	.....	.....	2	124 00	40 30	40 30
	Thessalon, Town	3	.....	.....	.....	.....	3	.....	.....	2	12	774 00	251 55	251 55
	*Thessalon, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Plummer, add'l.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hallam	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Salter and May and 116	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Tarbutt and Tarbutt, add'l. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Johnson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Denison, Drury and Graham ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Blind River, Town	3	.....	.....	.....	.....	3	.....	.....	.....	7	1,514 00	492 05	492 05
	Webbwood, Town	2	.....	.....	.....	.....	2	.....	.....	1	5	510 00	165 75	165 75
	*McDonald, Meredith, etc.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Bruce Mines, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Massey, Town	2	.....	.....	.....	.....	2	.....	.....	.....	5	1,410 00	458 25	458 25
	Thompson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	3	.....	.....	.....	.....	3	.....	.....	.....	5	370 00	.....	235 30
	Transferred from Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	218 90	.....	.....
	Totals	14	.....	.....	.....	.....	14	.....	.....	3	36	4,920 90	1,407 90	1,643 20

* Local Option. † Payable to Province, less proportion of expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Brant..	*South Dumfries	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Brantford Township, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Onondaga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Burford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Tuscarora	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Paris, Town	4	.....	.....	1	.....	5	.....	.....	.....	8	1,766 00	532 77	532 78
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31 07	.....	.....
	Totals	4	.....	.....	1	.....	5	.....	.....	.....	8	1,797 07	532 77	532 78
South Brant...	*Brantford Township, South	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Oakland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Brantford City	9	.....	.....	3	1	13	.....	.....	1	31	6,112 00	2,173 05	2,173 04
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45 31	.....	.....
	Totals	9	.....	.....	3	1	13	.....	.....	1	31	6,157 31	2,173 05	2,173 04
Brockville.....	Brockville, Town	6	.....	.....	2	1	9	.....	.....	.....	13	5,516 00	2,316 34	2,316 34
	*Rear of Yonge and Escott	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Elizabethtown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Athens, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Elmsley, South	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	50 40	50 40
	Kitley	3	.....	.....	.....	.....	3	.....	.....	1	.....	360 00	151 20	151 20
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	10	.....	.....	2	1	13	.....	.....	1	13	5,996 00	2,517 94	2,517 94

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Centre Bruce..	*Paisley, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Kincardine, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Chesley, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Greenock	3	.....	.....	.....	.....	3	.....	.....	1	.....	360 00	81 00	81 90
	*Huron	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Kincardine, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Elderslie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	383 61	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24 88	.....	.....
	Totals	3	.....	.....	.....	.....	3	.....	.....	1	.....	768 49	81 00	81 00
North Bruce...	*Tiverton, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Port Elgin	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	262 50	262 50
	*Southampton, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Tara, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wiarton, Town	4	.....	.....	.....	.....	4	.....	.....	.....	9	1,418 00	496 30	496 30
	*Bruce	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Saugeen	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Arran	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Amabel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Eastnor	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Albermarle	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hepworth, Village	.....	.....	1	.....	.....	1	.....	.....	1	.....	125 00	43 75	43 75
	*Lindsay and St. Edmunds	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	St. Edmunds, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72 96	.....	.....
	Totals	7	.....	1	.....	.....	8	.....	.....	1	9	2,365 96	802 55	802 55

*Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c
South Bruce...	*Lucknow, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Teeswater, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Walkerton, Town	4	.....	.....	.....	.....	4	.....	.....	.....	4	1,408 00	457 60	457 60
	Culross	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	39 00	39 00
	Carrick	6	.....	.....	.....	.....	6	.....	.....	.....	.....	720 00	234 00	234 00
	Brant	3	.....	.....	.....	.....	3	.....	.....	2	.....	360 00	117 00	117 00
	*Kinloss	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	14	.....	.....	.....	.....	14	.....	.....	2	4	2,610 00	847 60	847 60
Carleton.....	Richmond, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*March	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Huntley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Nepean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*North Gower	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Goulborn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Marlborough	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	.....	.....
	Fitzroy	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	.....	.....
	Torbolton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	.....	.....
	" " Ont. Treas.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	250 00	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	79 17	.....	.....
	Totals	3	.....	.....	.....	.....	3	.....	.....	.....	.....	689 55	.....	.....

* Local Option.

SCHEDULE B.—Continued.

License District	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Dufferin	*Orangeville, Town	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	*Mulmur	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	*Mono	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	*Melancthon	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	*Garafraxa, East				L	O	C	A	L	O	P	T	I	O	N			
	*Shelburne, Village	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	*Amaranth	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	*East Luther	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	*Grand Valley, Village	....	....	....	....	....	....	....	....	....	....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dundas	*Iroquois, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Chesterville, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	520 00	143 00	143 00
	Morrisburg, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	206 25	206 25
	Winchester, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Matilda	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Williamsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Winchester, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Mountain	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 40	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33 16	.....	.....
	Totals	5	.....	.....	.....	.....	5	.....	....	.....	.....	1,310 56	349 25	349 25

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
E. Durham...	Port Hope, Town	8	.....	.....	1	.....	9	.....	.....	1	6	3,322 00	1,216 88	1,216 87
	*Millbrook, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hope	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cavan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Manvers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	8	.....	.....	1	.....	9	.....	.....	1	6	3,322 00	1,216 88	1,216 87
W. Durham..	*Bowmanville, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Newcastle, Village	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	62 50	.....	.....
	*Clarke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Darlington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cartwright	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20 34	.....	.....
	" " previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 27	.....	.....
	Grant from the Province	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	225 00	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	310 11	.....	.....
East Elgin....	Aylmer, Town	3	.....	.....	.....	.....	3	.....	.....	.....	4	1,058 00	304 32	304 32
	Port Stanley, Village	2	.....	1	.....	.....	3	.....	.....	.....	.....	650 00	191 75	191 75
	Springfield, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	71 87	71 88
	Vienna, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Yarmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	South Dorchester	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Malahide	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Bayham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	6	.....	1	.....	.....	7	.....	.....	.....	4	1,958 00	567 95	567 95

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Elgin...	St. Thomas, City	13	.....	.....	3	.....	16	.....	.....	1	19	8,038 00	3,200 05	3,200 05
	*Southwold	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Dunwich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Aldborough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Dutton, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	West Lorne, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Rodney Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	13	.....	.....	3	.....	16	.....	.....	1	19	8,038 00	3,200 05	3,200 05
North Essex..	Maidstone	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	33 00	33 00
	Rochester	3	.....	.....	.....	.....	3	1	.....	1	.....	390 00	107 25	107 25
	East Sandwich	8	.....	1	.....	.....	9	2	.....	4	.....	1,080 00	297 00	297 00
	West Sandwich	10	.....	2	.....	.....	12	2	.....	.....	.....	1,380 00	379 50	379 50
	Belle River, Village	3	.....	.....	1	.....	4	.....	.....	.....	.....	1,020 00	280 50	280 50
	Anderdon	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	66 00	66 00
	Tilbury, N.	2	.....	.....	.....	.....	2	.....	.....	2	.....	400 00	110 00	110 00
	*South Sandwich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	29	.....	3	1	.....	33	5	.....	9	.....	4,630 00	1,273 25	1,273 25

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
												$ c.	$ c.	$ c.
South Essex..	*Mersea													
	*Leamington, Town													
	Amherstburg, Town	3			1		4			3	7	2,164 00	703 35	703 35
	Malden	2					2			1		240 00	78 00	78 00
	*Gosfield, South													
	*Kingsville, Town													
	Essex, Town	1					1	1			5	347 50	111 00	111 00
	*Colchester, North													
	*Colchester, South													
	Pelee Island	1					1				1	122 00	39 60	39 60
	*Tilbury, West													
	Gosfield, North													
	Transferred from previous year											7 40		
	" " Local Option													
	Totals	7			1		8	1		4	13	2,880 90	931 95	931 95
Fort William.	Fort William	12			3	1	16				28	7,606 00	3,042 40	3,042 40
	Paipoonge	1					1					200 00	80 00	80 00
	Transferred from previous year											34 70		
	Transferred											105 00		
	Totals	13			3	1	17				28	7,945 70	3,122 40	3,122 40

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six Months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
Frontenac....												$ c.	$ c.	$ c.
	Portsmouth, Village	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	125 00	31 25	31 25
	*Kingston, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Portland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Pittsburg, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Garden Island, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Storrington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Kennebec	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wolfe Island	.....	1	9 mos	.....	.....	.....	2	.....	.....	.....	127 50	15 00	15 00
	Howe Island	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Loughboro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Bedford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	356 26	.....	.....
	" " previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12 11	.....	.....
	Totals	.....	1	.....	.....	.....	1	4	.....	.....	.....	620 87	46 25	46 25
Glengarry.....	*Alexandria, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Charlottenburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Lancaster, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Kenyon	L O C A L O P T I O N												
	*Lochiel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Lancaster, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Maxville, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Grenville.....	Prescott, Town	3	.....	.....	2	.....	5	2	.....	.....	7	1,939 00	744 83	744 82
	*Cardinal, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Kemptville, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Merrickville, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	191 67	191 67
	*Augusta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Wolford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	South Gower	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Edwardsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	78 35	.....	.....
	Transferred from Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	.....	.....
	Totals	5	.....	.....	2	.....	7	2	.....	.....	7	2,517 73	936 50	936 50
Centre Grey..	*Thornbury, Town	.....	.....	.....	...	.....	....	.....	.....	.....	.....	.....	.....	.....
	*Artemesia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Flesherton, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Holland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Collingwood, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Euphrasia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Osprey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sullivan	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	27 00	27 00
	Markdale, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	112 50	112 50
	Chatsworth, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	5625	56 25
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	223 72	.....	.....
	Totals	4	.....	.....	.....	.....	4	.....	.....	.....	.....	1,093 72	195 75	195 75

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Grey...	*Owen Sound, Town	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	*Meaford, Town	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	*Derby	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	*Keppel	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	*Sydenham	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	St. Vincent	....	.....	.....	L	O C	A L	O	P T	I O	N	.....	.....	.....
	*Sarawak	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	*Shallow Lake, Village	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	Transferred from previous year.	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	" " Local Option.	....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	....	....	....	....	.....	.....	.....
South Grey...	*Proton	.....	.....	.....	.....	.....	.....	.. ..	. ...	.....	.....	.....	.....	.....
	*Durham, Town	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	.....	.....
	*Bentinck	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	.....	.....
	Glenelg	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	.....	.....
	Normanby	4	.....	1	.....	.....	5	....	.....	2	.....	540 00	175 50	175 50
	*Egremont	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	.....	.....
	*Dundalk, Village	.....	.....	.....	.....	.....	.....	....	....	.....	.....	.....	.....	.....
	Hanover, Town	3	.....	.....	.....	.. ..	3	1	.....	.....	3	1,145 50	372 28	372 29
	Neustadt, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	162 50	162 50
	Transferred from previous year.	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50 13	.....	.....
	Totals	9	.....	1	.....	.....	10	1	.....	3	3	2,235 63	710 28	710 29

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Haldimand...	Cayuga, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	181 25	181 25
	Caledonia, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	271 88	271 87
	Oneida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Cayuga, North, Township	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	43 50	43 50
	Cayuga, South	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dunn	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	87 00	87 00
	Rainham	4	.....	.....	.....	.....	4	.....	.....	.....	.....	480 00	174 00	174 00
	*Walpole	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Seneca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hagersville, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	271 87	271 88
	*Jarvis, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50 49	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34 63	.....	.....
	Totals	15	.....	.....	.....	.....	15	.....	.....	.....	.....	2,925 12	1,029 50	1,029 50
Haliburton†...	Minden	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	30 00	30 00
	*Dysart	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Anson	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	30 00	30 00
	Sherbourne	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	30 00	30 00
	*Glamorgan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Snowden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Monmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stanhope	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	90 00	90 00

*Local Option. †Amalgamated with Victoria, Nov., 1915.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Halton	*Nelson	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Nassagaweya	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Esquesing	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	96 00	96 00
	Burlington, Village	2	.....	.....	.....	1	3	.....	.....	.....	4	758 00	303 20	303 20
	Georgetown, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	300 00	300 00
	Oakville, Town	2	.....	.....	.....	.....	2	.....	.....	.....	4	708 00	283 20	283 20
	Milton, Town	3	.....	.....	.....	.....	3	.....	.....	.....	7	1,064 00	425 60	425 60
	Acton, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	200 00	200 00
	*Trafalgar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45 05	.....	.....
	Totals	14	.....	.....	.....	1	15	.....	.....	1	15	4,065 05	1,608 00	1,608 00
Hamilton	Hamilton, City	54	1	.....	16	3	74	2	.....	3	137	82,287 80	37,586 83	37,586 82
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	54	1	.....	16	3	74	2	.....	3	137	82,287 80	37,586 83	37,586 82
East Hastings	Tyendinaga	5	.....	.....	.....	.....	5	.....	.....	.....	.....	600 00	195 00	195 00
	Hungerford	2	.....	.....	.....	....	2	.....	.....	1	.....	250 00	81 25	81 25
	*Thurlow	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Deseronto, Town	4	.....	.....	1	.....	5	.....	.....	3	8	1,766 00	573 95	573 95
	*Tweed, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Huntingdon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	11	.....	.....	1	.....	12	.....	.....	4	8	2,616 00	850 20	850 20

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Hastings	*Marmora and Lake													
	*Stirling, Village													
	*Madoc, Township													
	Elzevir and Grimsthorpe	2					2					240 00	60 00	60 00
	*Tudor and Cashel													
	*Wollaston													
	Monteagle and Herschel	1					1					120 00	30 00	30 00
	*Rawdon													
	Madoc, Village	2					2					520 00	130 00	130 00
	Wicklow, Bangor and McClure							1				30 00	7 50	7 50
	*Dungannon													
	Carlow and Mayo													
	*Limerick													
	*Faraday													
	Marmora, Village	2					2		1			522 50	130 63	130 62
	Bancroft, Village	2					2					500 00	125 00	125 00
	Transferred from previous year													
	" " Local Option													
	Totals	9					9	1	1			1,932 50	483 13	483 12
West Hastings	Belleville, City	14			3	1	17			5	29	8,608 00	3,636 71	3,636 71
	Trenton, Town	6			2		8			1	10	2,820 00	1,191 42	1,191 42
	*Sidney													
	Transferred from previous year											7 79		
	" " Local Option											61 37		
	Totals	20			5	1	25			6	39	11,497 16	4,828 13	4,828 13

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions.		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Centre Huron..	Grey	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	McKillop	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Brussels, Village	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Seaforth, Town	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Goderich, Town				C A	N A	D A	T	E M P	E R	A N C E		A C T	
	Clinton, Town	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Colborne	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hullett	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Huron..	Morris	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Turnberry	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wroxeter, Village	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Blyth, Village	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wingham, Town	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Howick				C A	N A	D A	T	E M P	E R	A N C E		A C T	
	Wawanosh, W.	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wawanosh, E.	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ashfield	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Huron.	Exeter, Village	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bayfield, Village	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stephen	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hay	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Tuckersmith	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Goderich, Tp.				C A N A D A			T E M P E R A N C E					A C T	
	Usborne	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stanley	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hensall, Village	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option.	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kenora.....	Dryden, Town	2	.....	.....	1	.....	3	.....	.....	.....	2	1,004 00	401 60	401 60
	Van Horne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Kenora, Town	9	.....	.....	2	1	12	.....	.....	.....	16	5,023 50	2,009 40	2,009 40
	Keewatin, Town	2	.....	.....	1	.....	3	.....	.....	1	6	1,012 00	404 80	404 80
	Machin	1	.....	.....	.....	.....	1	.....	.....	1	1	122 00	48 80	48 80
	Sioux Lookout, Town	2	.....	.....	.....	.....	2	.....	.....	1	7	514 00	205 60	205 60
	*Unorganized Territory	2	.....	2	.....	.....	4	.....	.....	.....	1	362 00	.....	289 60
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	18	.....	2	4	1	25	.....	.....	3	33	8,037 50	3,070 20	3,359 80

*Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Kent....	*Howard													
	*Blenheim, Town													
	Dresden, Town	2					2				4	548 00	191 80	191 80
	Thamesville, Village	2					2					500 00	175 00	175 00
	*Camden													
	Zone													
	Bothwell, Town	2			1		3				2	774 00	270 90	270 90
	*Harwich													
	*Orford													
	Ridgetown, Town	2			1		3			1	3	1,056 00	369 60	369 60
	Transferred from previous year													
	" " Local Option.													
	Totals	8			2		10			1	9	2,878 00	1,007 30	1,007 30
West Kent....	Chatham, City	13			2	1	16			2	22	7,594 00	3,227 45	3,227 45
	Chatham, Township													
	Dover, E. and W.	3					3	2		1		405 00	172 13	272 12
	Wallaceburg, Town	5			1		6				5	2,110 00	896 75	896 75
	*Raleigh													
	Tilbury, Town	3					3				7	1,064 00	452 20	452 20
	*Tilbury, East													
	Romney													
	Wheatley, Village													
	Transferred from previous year											40 36		
	" " Local Option.											194 06		
	Totals	24			3	1	28	2		3	34	11,407 42	4,748 53	4,748 52

* Local Option.

SCHEDULE B.—Statement by Municipalities showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province.
		Ordinary.	Beer and Wine.					Tavern	Shop.					
												$ c.	$ c.	$ c.
Kingston	Kingston, City	15	.....	.....	6	1	22	.....	.....	2	34	10,618 00	4,393 15	4,393 15
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	15	.....	.....	6	1	22	.....	.....	2	34	10,618 00	4,393 15	4,393 15
East Lambton	*Bosanquet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Forest, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Warwick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Brooke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Wyoming, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Watford, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	215 63	215 62
	*Euphemia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Plympton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Arkona, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Thedford, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	143 75	143 75
	Alvinston, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	215 62	215 63
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	75 29	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	8	.....	.....	.....	.....	8	.....	.....	.....	.....	2,075 29	575 00	575 00

* Local Option

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions.		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Lambton.	Petrolia, Town	4	.....	1	1	.....	6	.....	.....	.....	5	1,935 00	822 37	822 38
	*Moore	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Sarnia, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sombra	5	.....	.....	.....	.....	5	.....	.....	3	.....	625 00	265 63	265 63
	Oil Springs, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	212 50	212 50
	*Enniskillen	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sarnia, City	10	.....	.....	2	.....	12	.....	.....	1	25	6,050 00	2,571 25	2,571 25
	Point Edward, Village	.....	2	.....	.....	.....	2	.....	.....	.....	.....	375 00	159 37	159 37
	*Dawn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Courtright, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	400 00	170 00	170 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14 17	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	56 90	.....	.....
	Totals	22	2	1	3	.....	28	.....	.....	4	30	9,956 07	4,201 12	4,201 13
North Lanark	*Lanark, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Pakenham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Dalhousie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Almonte, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Carleton Place, Town	3	.....	.....	.....	.....	3	2	.....	.....	4	1,233 00	277 43	277 42
	*Ramsay	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Lanark, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Lavant	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	27 00	27 00
	Darling	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Beckwith	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	147 35	.....	.....
	Totals	4	.....	.....	.....	.....	4	2	.....	.....	4	1,500 35	304 43	304 42

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Lanark.	Perth, Town	6	.....	.....	2	.....	8	.....	.....	1	10	2,820 00	1,057 50	1,057 50
	Smith's Falls, Town	5	.....	.....	.....	.....	5	.....	.....	1	13	2,276 00	853 50	853 50
	Montague	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Elmsley, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Burgess, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sherbrooke, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bathurst	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Drummond	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*South Sherbrooke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	11	.....	.....	2	.....	13	.....	.....	2	23	5,096 00	1,911 00	1,911 00
Leeds	Gananoque, Town	4	.....	.....	.....	...	4	1	1	.....	5	2,260 00	791 00	791 00
	*Newboro', Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Bastard and Burgess	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Crosby	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Leeds and Lansdowne, Front	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Leeds and Lansdowne, Rear	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	South Crosby	1	.....	1	.....	.....	2	.....	.....	.....	.....	180 00	63 00	63 00
	Young, Front	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Escott, Front	.....	.....	1	.....	.....	1	.....	.....	.....	.....	100 00	35 00	35 00
	Westport, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	262 50	262 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9 36	.....	.....
	Totals	8	.....	2	.....	.....	10	1	1	.....	5	3,299 36	1,151 50	1,151 50

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders			
												$ c.	$ c.	$ c.
Lennox.....	Napanee, Town	6	.....	.....	2	.....	8	.....	.....	4	3	2,822 00	1,093 35	1,093 35
	Bath, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	96 88	96 87
	Adolphustown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Amherst Island	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	45 00	45 00
	*Ernestown	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Fredericksburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	South Fredericksburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Richmond	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	106 48	.....	.....
	Totals	8	.....	.....	2	.....	10	.....	.....	5	3	3,298 48	1,235 23	1,235 22
Lincoln.....	*Niagara, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Grimsby, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Grantham	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	30 00	8 25	8 25
	Merritton, Town	3	.....	.....	.....	.....	3	.....	.....	.....	.....	1,050 00	341 25	341 25
	*Grimsby, South	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Port Dalhousie, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	243 75	243 75
	*Clinton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Grimsby, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	162 50	162 50
	Niagara, Town	4	7 mos.	.....	.....	.....	4	1	1	.....	5	636 65	225 48	225 48
	*Beamsville, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Louth	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	39 00	39 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	13	.....	.....	.....	.....	13	2	1	.....	5	3,086 65	1,020 23	1,020 23

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
London	London, City	22	.....	.....	5	2	33	4	.....	.....	67	19,834 00	8,478 05	8,478 05
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	22	.....	.....	5	2	33	4	.....	.....	67	19,834 00	8,478 05	8,478 05
Manitoulin	*Little Current, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Gore Bay, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Assiginack	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Howland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Gordon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Tehkummah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Billings	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Carnarvon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*May, Slater and Massey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Nairn, Lorne and Hyman	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	60 00	60 00
	*Hallam	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Graham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cockburn Island	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Unorganized Territory	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25 12	.....	.....
	Totals	2	.....	.....	.....	.....	2	.....	.....	.....	.....	265 12	60 00	60 00

* Canada Temperance Act.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
East Middlesex	London, Township	4	1	.....	.....	1	6	.....	.....	.....	.....	$ c. 620 00	$ c. 139 50	$ c. 139 50
	*Dorchester, North	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Westminster	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Nissouri, West	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	163 40	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5 10	.....	.....
	Grant from Province	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200 00	.....	.....
	Totals	4	1	.....	.....	1	6	.....	.....	.....	.....	988 50	139 50	139 50
North Middlesex	*East Williams	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	West Williams	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	McGillivray	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Adelaide	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Biddulph	1	.....	.....	.....	.....	1	.....	.....	.....	.....	135 00	30 38	30 38
	*Ailsa Craig, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Parkhill, Town	3	.....	.....	.....	.....	3	.....	.....	.....	4	758 00	170 10	170 10
	Lucan, Village	1	.....	.....	.....	....	1	.....	.....	.....	.....	250 00	56 25	56 25
	*Strathroy, Town	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....
	M tcalfe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	49 10	.....	.....
	" " previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44 53	.....	.....
	Totals	5	...	.....	.....	.....	5	.....	.....	.....	4	1,236 53	256 73	256 73

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Middlesex	*Ekfrid													
	*Wardsville, Village													
	*Delaware													
	*Caradoc													
	Glencoe, Village	2					2					520 00		
	Mosa													
	*Newbury, Village													
	*Lobo													
	Transferred from previous year													
	" " Ontario Treasury											281 54		
	Totals	2					2					801 54		
Monck	*Wainfleet													
	Canborough													
	*Caistor													
	Sherbrooke	1					1					120 00	39 00	39 00
	Dunnville, Town	4			1		5				6	1,762 00	572 65	572 65
	*Gainsborough													
	*Pelham													
	Moulton													
	Transferred from previous year											40		
	Totals	5			1		6				6	1,882 40	611 65	611 65

*Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Muskoka.....	*McLean and Ridout.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Draper	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	42 00	42 00
	Gravenhurst, Town	3	.....	.....	.....	.....	3	.....	.....	1	6	1,062 00	371 70	371 70
	Medora and Wood	.....	.....	2	.....	.....	2	.....	.....	.....	.....	120 00	42 00	42 00
	*Bracebridge, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Huntsville, Town	3	.....	.....	.....	.....	3	.....	.....	1	6	1,062 00	371 70	371 70
	Monck	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Morrison	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stisted	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stephenson	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	42 00	42 00
	*Brunel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	McAuley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Port Carling, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Chaffey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ryde	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bala, Town	1	.....	.....	.....	.....	1	.....	.....	.....	4	258 00	90 30	90 30
	†Unorganized Territory	.....	.....	3	.....	.....	3	.....	.....	.....	.....	180 00	.....	126 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	9	.....	5	.....	.....	14	.....	.....	2	16	2,922 00	959 70	1,085 70

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions.		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Nipissing.....	North Bay, Town	7	.....	.....	2	.....	9	.....	.....	2	19	4,538 00	1,843 73	1,843 72
	McKim	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Mattawa, Town	4	.....	.....	1	.....	5	.....	.....	.....	7	1,594 00	647 57	647 58
	Widdifield	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bonfield, Town	2	.....	.....	.....	.....	2	.....	.....	.....	2	504 00	204 77	204 78
	Head, Clara and Maria	3	.....	.....	.....	.....	3	.....	.....	.....	4	368 00	149 50	149 50
	*Jocelyn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ferris	2	.....	.....	.....	.....	2	.....	.....	.....	1	242 00	98 33	98 32
	Milberta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bonfield	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	74 96	.....	.....
	Totals	18	.....	.....	3	.....	21	.....	.....	2	33	7,320 96	2,943 90	2,943 90
North Norfolk	Middleton	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	42 00	42 00
	Simcoe, Town	4	.....	.....	1	1	6	.....	.....	1	5	1,810 00	633 50	633 50
	*Windham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Townsend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Waterford, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Delhi, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	175 00	175 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25 98	.....	.....
	Totals	7	.....	.....	1	1	9	.....	.....	1	5	2,455 98	850 50	850 50

*Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Norfolk	*Walsingham, South													
	Woodhouse and Gore													
	*Charlotteville													
	Houghton													
	Port Dover, Village	3					3					750 00	168 75	168 75
	*Walsingham, North													
	*Port Rowan, Village													
	Transferred from Local Option											16 58		
	Grant from Ontario Treasury											175 00		
	Totals	3					3					941 58	168 75	168 75
East Northumberland	*Seymour													
	*Murray													
	*Cramahe													
	*Percy													
	*Colborne, Village													
	*Campbellford, Town													
	Hastings, Village	2					2			1		500 00	112 50	112 50
	*Brighton, Village													
	Brighton, Township													
	Transferred from previous year													
	" " Local Option											275 00		
	Totals	2					2			1		775 00	112 50	112 50

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
												$ c.	$ c.	$ c.
West Northumberland..	Alnwick	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	46 00	46 00
	*South Monaghan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Haldimand, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hamilton, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Cobourg, Town	7	.....	1	2	.....	10	1	.....	.....	15	4,417 50	1,696 35	1,696 34
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59 15	.....	.....
	Totals	8	.....	1	2	.....	11	1	.....	.....	15	4,596 65	1,742 35	1,742 34
North Ontario No. 1.	Uxbridge, Town	3	.....	.....	1	.....	4	.....	.....	.....	5	1,030 00	257 50	257 50
	*Brock	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Uxbridge, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Scott	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cannington, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 19	.....	.....
	" " Local Option..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22 93	.....	.....
	Totals	3	.....	.....	1	.....	4	.....	.....	.....	5	1,054 12	257 50	257 50
North Ontario No. 2.	Mara	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	30 00	.....	.....
	Thorah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Rama	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Beaverton, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6 47	.....	.....
	" " Local Option..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	151 78	.....	.....
	Grant from Province	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	175 00	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	363 25	.....	.....

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
												$ c.	$ c.	$ c.
South Ontario	*Reach													
	Oshawa, Town	4					4				12	1,904 00	730 00	730 00
	Whitby, Town	4			1		5				5	1,760 00	674 69	674 68
	*Whitby, Township													
	*Whitby, East, Township													
	Scugog													
	*Pickering, Township													
	Port Perry, Village	2			1		3			1		770 00	295 16	295 17
	Transferred from previous year													
	" " Local Option.											136 98		
	Totals	10			2		12			1	17	4,570 98	1,699 85	1,699 85
Ottawa	Ottawa, City	48	2 for 9 months.		20	4	72	1		4	153	77,358 89	35,403 32	35,403 33
	Transferred from previous year											15 57		
	Totals	48			20	4	72	1		4	153	77,374 46	35,403 32	35,403 33
North Oxford.	*East Nissouri													
	Blandford	1					1			1		120 00	48 00	48 00
	East Zorra													
	*Embro, Village													
	West Zorra													
	Woodstock, City	6			2		8				16	4,032 00	1,612 80	1,612 80
	*Blenheim, Township													
	Tavistock, Village	3			1		4					1,020 00	408 00	408 00
	Transferred from previous year											15 94		
	Totals	10			3		13			1	16	5,187 94	2,068 80	2,068 80

*Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Oxford	*Ingersoll, Town													
	Tillsonburg, Town	3			1		4				7	1,412 00	353 00	353 00
	*Norwich, Village													
	*North Oxford													
	North Norwich													
	*South Norwich													
	Dereham													
	West Oxford													
	*East Oxford													
	Transferred from Local Option											10 88		
	Totals	3			1		4				7	1,424 88	353 00	353 00
Parry Sound, East	Nipissing			1			1			1		60 00	21 00	21 00
	Chapman	1					1				1	122 00	44 20	44 20
	Himsworth, North	1					1				1	122 00	42 70	42 70
	Perry	2					2				2	244 00	86 95	86 95
	Machar													
	Sundridge, Village	1					1				2	254 00	92 03	92 02
	Burk's Falls, Village	1		1			2				2	379 00	135 77	135 78
	Himsworth, South													
	McMurrich	1					1					120 00	42 00	42 00
	Powassan, Town	2					1	1		1	2	545 67	197 23	197 24
	South River, Village	1					1				3	256 00	92 78	92 77
	Kearney, Town	2					2				1	502 00	181 95	181 95
	Trout Creek	2					2				4	508 00	177 90	177 90
	†Unorganized Territory	1					1					120 00		84 00
	Transferred from previous year													
	Totals	16		2			17	1		2	18	3,232 67	1,114 51	1,198 51

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Parry Sound West	*McKellar													
	Christie	1					1					150 00	54 37	54 38
	Parry Sound, Town	2			1		3				8	2,249 60	815 86	815 86
	Foley	1					1				1	202 00	73 20	73 20
	Humphrey	1		1			2				2	184 00	67 40	67 40
	Hagerman													
	*McDougall													
	†Unorganized Territory	3		1			4				1	422 00		307 40
	Transferred from previous year													
	Totals	8		2	1		11				12	3,207 60	1,010 83	1,318 24
Peel	Brampton, Town													
	Chinguacousy													
	Bolton, Village													
	Toronto, Township													
	Toronto, Gore					CANADA TEMPERANCE ACT								
	Streetsville, Village													
	Albion													
	Caledon													
	Port Credit, Village													
	Transferred from previous year													
	" " local option													
	Totals													

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Perth..	Mornington	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	105 00	105 00
	Ellice	4	.....	.....	.....	.....	4	.....	.....	.....	.....	480 00	210 00	210 00
	Wallace	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	*Elma	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Listowel, Town	4	.....	.....	1	.....	5	.....	.....	.....	3	1,756 00	770 37	770 37
	Stratford, City	10	.....	.....	2	....	12	.....	.....	.....	22	6,044 00	2,643 85	2,643 85
	North Easthope	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	105 00	105 00
	Milverton, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	218 75	218 75
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	150 59	.....	.....
	" Local Option..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27 96	.....	.....
	Totals	25	.....	.....	3	.....	28	.....	.....	.....	25	9,558 55	4,105 47	4,105 47
South Perth..	South Easthope	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	96 00	96 00
	*Fullarton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Mitchell, Town	4	.....	....	1	....	5	.....	.....	.....	5	1,280 00	508 87	508 88
	Hibbert	1	.....	.....	.....	....	1	.....	.....	.....	.....	120 00	48 00	48 00
	*Downie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	St. Mary's, Town	6	.....	.....	1	.....	7	....	.....	.....	12	2,474 00	963 25	963 25
	Blanshard	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Logan	1	.....	.....	.....	.....	1	.....	.....	....	.....	120 00	48 00	48 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	....	.....	36 52	.....	.....
	Totals	14	.....	.....	2	.....	16	.....	.....	.....	17	4,270 52	1,664 12	1,664 13

*Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
East Peterborough												$ c.	$ c.	$ c.
	*Asphodel													
	*Dummer													
	Douro													
	*Otonabee													
	Burleigh and Anstruther	1					1					120 00		
	*Norwood, Village													
	*Lakefield, Village													
	Belmont and Methuen													
	*Havelock, Village													
	*Chandos													
	Transferred from previous year													
	From Prov. Treasury											635 00		
	From Local Option: Amount refunded to Province											136 60		223 39
	Totals	1					1					891 60		223 39
West Peterborough														
	*Smith													
	Peterborough, City	11			3	1	15			2	31	7,112 00	2,784 50	2,784 50
	*North Monaghan													
	Ennismore													
	*Harvey													
	Galway and Cavendish													
	Transferred from previous year											13 03		
	" " Local Option.											20 03		
	Totals	11			3	1	15			2	31	7,145 06	2,784 50	2,784 50

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Port Arthur..	Neebing	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Port Arthur, City	16	.....	.....	2	3	21	.....	.....	1	43	9,236 00	3,694 40	3,694 40
	*Schreiber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Oliver	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Nepigon	2	.....	.....	1	.....	3	.....	.....	.....	.....	740 00	296 00	296 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	151 08	.....	.....
	Totals	18	.....	.....	3	3	24	.....	.....	1	43	10,127 08	3,990 40	3,990 40
Prescott.....	South Plantagenet	5	.....	.....	.....	....	5	.....	.....	1	.....	600 00	225 00	225 00
	East Hawkesbury	4	.....	.....	.....	.....	4	.....	.....	1	.....	480 00	180 00	180 00
	Longueil	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	North Plantagenet	5	.....	.....	1	.....	6	.....	.....	.....	.....	800 00	300 00	300 00
	Caledonia	2	.....	1	.....	.....	3	.....	.....	.....	.....	300 00	112 50	112 50
	Alfred	4	.....	.....	.....	.....	4	.....	.....	1	.....	480 00	180 00	180 00
	*West Hawkesbury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hawkesbury, Town	5	.....	.....	1	.....	6	.....	.....	2	6	2,112 00	792 50	792 50
	L'Orignal, Town	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	281 25	281 25
	*Vankleek Hill, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 54	.....	.....
	Totals	29	.....	1	2	.....	32	.....	.....	5	6	5,643 54	2,115 75	2,115 75

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Prince Edward	Picton, Town	6	.....	.....	1	.....	7	1	.....	.....	18	2,506 00	877 10	877 10
	*South Marysburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Wellington, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Sophiasburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hillier	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Ameliasburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hallowell	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Marysburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from local option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17 21	.....	.....
	Totals	6	.....	.....	1	.....	7	1	.....	.....	18	2,523 21	877 10	877 10
Rainy River	Emo	1	.....	.....	.....	.....	1	.....	.....	.....	1	152 00	53 15	53 15
	McIrvine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Chappell	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	42 00	42 00
	Atwood	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Fort Frances, Town	4	.....	.....	1	.....	5	.....	.....	.....	8	1,996 00	683 10	683 10
	Rainy River, Town	3	.....	.....	1	.....	4	1	.....	.....	4	1,363 00	466 20	466 20
	Morley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Lavallee	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dilke	1	.....	.....	.....	.....	1	.....	.....	.....	.....	200 00	67 50	67 50
	Delhi	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Districts	1	.....	.....	.....	.....	1	1	.....	.....	2	134 00	.....	93 70
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90 15	.....	.....
	Totals	11	.....	.....	2	.....	13	2	.....	.....	15	4,055 15	1,311 95	1,405 65

* Local Option. † Payable to Province, less expenses

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
												$ c.	$ c.	$ c.
North Renfrew.	Bromley	2					2					240 00	96 00	96 00
	Pembroke, Town	8			2		10	1		1	14	5,665 50	2,255 29	2,255 28
	*Ross													
	*Westmeath													
	Wilberforce, etc.	1					1					120 00	48 00	48 00
	Petawawa	1					1					120 00	48 00	48 00
	Rolph, Buchanan and Wylie	1					1					120 00	46 50	46 50
	*Cobden, Village													
	Transferred from previous year													
	Totals	13			2		15	1		1	14	6,265 50	2,493 79	2,493 78
South Renfrew.	Eganville, Village	3			1		4					1,020 00	357 00	357 00
	*McNab													
	*Renfrew, Town													
	Grattan													
	*Brougham													
	Brudenell and Lyndock	2					2					240 00	84 00	84 00
	Arnprior, Town	2					2				6	1,412 00	494 20	494 20
	Radcliffe and Raglan	1					1					120 00	42 00	42 00
	*Bagot and Blithfield													
	Griffith and Matawachan													
	Admaston													
	Sherwood, Jones and Burns	3					3					360 00	126 00	126 00
	Hagarty, etc.													
	Sebastopol													
	Horton													
	Killaloe Station, Village	1					1					250 00	87 50	87 50
	Transferred from previous year													
	" " Local Option.											10 45		
	Totals	12			1		13				6	3,412 45	1,190 70	1,190 70

*Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total	Tavern.	Shop.	Transfers.	Bartenders.			
Russell	Cambridge	2					2					$ c. 240 00	$ c. 90 00	$ c. 90 00
	Russell	6					6			1		900 00	337 50	337 50
	Clarence	6					6			3		720 00	270 00	270 00
	Gloucester	3				1	4			1		440 00	165 00	165 00
	Cumberland	4					4					480 00	180 00	180 00
	*Osgoode													
	Rockland Town	4					4				1	1,402 00	525 75	525 75
	Casselman, Village	2					2					500 00	187 50	187 50
	Eastview, Town	2					2			1	3	706 00	264 75	264 75
	Transferred from previous year													
	" " Local Option											43 50		
	Totals	29				1	30			6	4	5,431 50	2,020 50	2,020 50
Sault Ste. Marie	Sault Ste. Marie	13				1	14			5	43	6,636 00	2,396 30	2,396 30
	*Korah													
	Transferred fram previous year													
	Totals	13				1	14			5	43	6,636 00	2,396 30	2,396 30
St. Catharines	St. Catharines, City	10			2	1	13			4	29	6,108 00	2,290 50	2,290 50
	Transferred from previous year													
	" " Local Option											114 00		
	Totals	10			2	1	13			4	29	6,222 00	2,290 50	2,290 50

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued

License District.	Municipality	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop					
												$ c.	$ c.	$ c.
Centre Simcoe..	Barrie, Town	9			2		11			1	29	5,008 00	2,016 01	2,016 01
	*Sunnidale													
	Flos	4					4			1		600 00	244 68	244 68
	Tiny													
	Vespra													
	Transferred from previous year											49 26		
	Totals	13			2		15			2	29	5,657 26	2,260 69	2,260 69
East Simcoe...	*Orillia, Township													
	*Oro													
	Tay													
	*Medonte													
	*Coldwater													
	Penetanguishene, Town	4		1			5		1	1	8	1,841 00	460 25	460 25
	*Orillia, Town													
	Matchedash													
	*Midland, Town													
	*Victoria Harbor, Village													
	Transferred from local option											250 00		
	Totals	4		1			5		1	1	8	2,091 00	460 25	460 25

*Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Simcoe ..	Adjala	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	27 00	27 00
	Bradford, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	112 50	112 50
	*Tecumseh	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Innisfil	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*West Gwillimbury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Beeton, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Tottenham, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	From Province	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	308 48	.....	.....
	Totals	3	.....	.....	.....	.....	3	.....	.....	1	.....	928 48	139 50	139 50
West Simcoe...	Essa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Nottawasaga	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stayner, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Collingwood, Town				LOCAL			OPTION						
	Tossorontio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Alliston, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Creemore, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Stormont.....	Cornwall, Town	7	.....	.....	3	.....	10	.....	.....	1	13	6,526 00	2,594 92	2,594 92
	Cornwall Township	4	.....	.....	.....	.....	4	.....	.....	.....	.....	1,400 00	556 66	556 67
	*Osnabruck	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Finch	2	.....	.....	.....	.....	2	.....	.....	.....	.....	300 00	120 19	120 18
	*Roxborough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Finch, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	13	.....	.....	3	.....	16	.....	.....	1	13	8,226 00	3,271 77	3,271 77
Sturgeon Falls	Springer	1	.....	.....	.....	.....	1	.....	.....	1	.....	165 00	61 88	61 88
	Caldwell	2	.....	.....	.....	.....	2	.....	.....	1	3	336 00	126 00	126 00
	Dunnett and Rutter	2	.....	.....	.....	.....	2	.....	.....	.....	1	282 00	105 75	105 75
	Sturgeon Falls, Town	3	.....	.....	1	.....	4	.....	.....	3	8	1,566 00	587 25	587 24
	Cosby and Mason	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	†Unorganized Territory	1	.....	.....	.....	.....	1	.....	.....	.....	2	124 00	.....	93 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40 95	.....	.....
	Totals	10	.....	.....	1	.....	11	.....	.....	5	14	2,633 95	925 88	1,018 87

*Local Option. †Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Sudbury	Chelmsford, Town	2					2			1	2	504 00	138 70	138 70
	Balfour	1					1				1	122 00	33 60	33 60
	Blezard	1					1			1		120 00	33 00	33 00
	Chapleau	2					2				5	390 00	98 00	98 00
	Drury, Denison and Graham	1					1					190 00	47 50	47 50
	Hagar	1					1					120 00	33 00	33 00
	Hanmer	1					1					120 00	33 00	33 00
	Rayside	1					1					120 00	33 00	33 00
	Sudbury	6			2	1	9			1	36	3,822 00	1,037 65	1,037 65
	†Unorganized Territory	1					1				1	122 00		61 20
	Transferred from previous year											25		
	Totals	17			2	1	20			3	45	5,630 25	1,487 45	1,548 65
Temiskaming	New Liskeard, Town	3			1		4			1	6	1,562 00	405 60	405 60
	Haileybury, Town	4		8 mo	1		5				10	2,353 34	687 92	687 92
	Cobalt, Town													
	Latchford, Town							1				62 50	18 75	18 75
	Englehart, Town	2					2			1	2	1,325 23	265 62	265 62
	Evanturel													
	Coleman													
	Charlton, Town	1					1			1	1	252 00	42 44	42 43
	*Dymond													
	Bucke													
	Dack													
	*Harley													
	Cochrane, Town	2					2				4	1,308 00	391 00	391 00
	†Unorganized Territory			3			3			1	1	182 00		108 50
	Transferred from previous year											196 76		
	Totals	12		4	2		17	1		4	24	7,241 83	1,811 33	1,919 82
Toronto	Toronto, City	107	‡1	3	50	17	178			8	444	255,938 00	103,706 74	133,706 73
	Transferred from previous year											41 53		
	Totals	107	‡1	3	50	17	178			8	444	255,979 53	103,706 74	133,706 73

*Local Option. †Payable to Province, less expenses. ‡Six months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Victoria†.	*Omemee, Village													
	Fenelon Falls, Village	3					3					750 00	187 50	187 50
	*Fenelon, Township													
	*Bobcaygeon, Village													
	*Somerville													
	Bexley	1					1					120 00	30 00	30 00
	Digby													
	Verulam													
	Laxton													
	Emily													
	Transferred from previous year													
	" " Local Option											86 15		
	Totals	4					4					956 15	217 50	217 50
West Victoria	Lindsay, Town	8			1		9			2	12	4,074 00	1,469 83	1,469 83
	*Woodville, Village													
	*Eldon													
	Ops													
	Carden													
	Dalton													
	*Mariposa													
	Transferred from previous year											67 13		
	Transferred from Local Option											124 35		
	" " E. Victoria											194 75		
	" " Haliburton											59 17		
	Totals	8			1		9			2	12	4,519 40	1,469 83	1,469 83

* Local Option. †Amalgamated with W. Victoria, Nov., 1915

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Waterloo	Waterloo Tp., N. Part	5					5					600 00	262 50	262 50
	Woolwich	5					5			1		600 00	262 50	262 50
	Wellesley	12			1		13			1		1,640 00	717 50	717 50
	Kitchener, City	9			2	1	12				27	5,604 00	2,451 75	2,451 75
	Waterloo, Town	7			1	1	9				2	2,854 00	1,248 62	1,248 63
	Elmira, Village	3			1		4					1,400 00	612 50	612 50
	Transferred from previous year													
	Totals	41			5	2	48			2	29	12,698 00	5,555 37	5,555 38
South Waterloo	*Galt, Town													
	Preston, Town	5			1		6			1	10	2,120 00	888 25	888 23
	Wilmot	8		1			9					1,020 00	428 25	428 25
	Waterloo Tp., S. Part	3					3					360 00	150 75	150 75
	Hespeler, Town	2					2				5	710 00	297 35	297 35
	*North Dumfries					1	1					50 00	21 25	21 25
	New Hamburg, Village	4			1		5					1,270 00	531 82	531 81
	Ayr, Village	2					2					500 00	209 37	209 38
	Transferred from Local Option											33 69		
	Totals	24		1	2	1	28			1	15	6,063 69	2,527 04	2,527 02

*Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Welland.....	Niagara Falls, City	12	.....	1	4	1	18	.....	.....	.....	20	8,340 00	3,627 90	3,627 90
	Crowland	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 20	52 20
	Chippawa, Village	2	.....	.....	1	.....	3	.....	.....	.....	.....	770 00	334 95	334 95
	Fort Erie, Village	3	.....	.....	1	.....	4	.....	.....	.....	.....	1,020 00	443 70	443 70
	Port Colborne, Village	4	.....	.....	1	.....	5	.....	.....	.....	.....	1,750 00	761 25	761 25
	Humberstone	4	.....	.....	.....	.....	4	.....	.....	1	.....	480 00	208 80	208 80
	Humberstone, Village	2	.....	.....	1	.....	3	.....	.....	.....	.....	770 00	334 95	334 95
	Stamford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	104 40	104 40
	*Thorold, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Thorold, Town	3	.....	.....	1	.....	4	.....	.....	.....	9	1,418 00	616 83	616 83
	Welland, Town	5	.....	.....	2	1	8	.....	.....	.....	11	3,222 00	1,401 58	1,401 56
	Willoughby	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 20	52 20
	Bertie	6	.....	.....	.....	.....	6	1	.....	.....	.....	760 42	330 79	330 79
	Bridgeburg, Village	4	.....	.....	.....	.....	4	.....	.....	1	.....	1,400 00	609 00	609 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	49	.....	1	11	2	63	1	.....	2	40	20,410 42	8,878 55	8,878 53
East Wellington.	Mount Forest, Town	4	.....	.....	.....	.....	4	.....	.....	1	2	1,004 00	351 40	351 40
	Elora, Village	3	.....	.....	.....	.....	3	.....	.....	2	.....	750 00	262 50	262 50
	*Nichol	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Fergus, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	262 50	262 50
	*West Garafraxa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Erin, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Arthur, Township	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	42 00	42 00
	*West Luther	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Erin, Village	1	.....	.....	.....	.....	1	.....	.....	1	.....	250 00	87 50	87 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23 52	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	12	.....	.....	.....	.....	12	.....	.....	4	2	2,897 52	1,005 90	1,005 90

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Wellington.	Pilkington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Eramosa	.....	.....	....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Guelph, Township	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 75	48 75
	*Puslinch	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Guelph, City	13	.....	.....	2	1	16	.....	.....	.....	22	7,594 00	3,085 65	3,085 65
	Transferred from previous year	.....	.....	.....	.....	....	....	.....	.....	.....	.....	105 74	.....	.....
	Totals	14	.....	....	2	1	17	.....	.....	.....	22	7,819 74	3,134 40	3,134 40
West Wellington.	Clifford, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	187 50	187 50
	Arthur, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	281 25	281 25
	Harriston, Town	3	....	.....	.....	.....	3	.....	.....	1	3	816 00	306 00	306 00
	Drayton, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	187 50	187 50
	Palmerston, Town	3	.....	....	1	.....	4	.....	.....	1	4	1,088 00	408 00	408 00
	*Maryborough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Minto	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Peel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69 89	.....	.....
	Totals	13	.....	.....	1	.....	14	.....	.....	3	7	3,723 89	1,370 25	1,370 25

*Local Option

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
North Wentworth.	Dundas, Town	5	1	.....	1	.....	7	.....	.....	1	9	$ c. 2,380 50	$ c. 922 27	$ c. 922 27
	*Beverley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*West Flamborough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*East Flamborough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Waterdown, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	193 75	193 75
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48 05	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	7	1	.....	1	.....	9	.....	.....	1	9	2,928 55	1,116 02	1,116 02
South Wentworth.	*Binbrook	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Ancaster	.....	.....	.....	.....	2	2	.....	.....	.....	.....	100 00	22 50	22 50
	Saltfleet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Barton	3	.....	.....	.....	2	5	.....	.....	.....	3	466 00	104 85	104 85
	*Glanford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Burlington Beach	2	.....	.....	.....	1	3	.....	.....	1	.....	290 00	65 25	65 25
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100 00	.....	.....
	Totals	5	.....	.....	.....	5	10	.....	.....	1	3	956 00	192 60	192 60
Windsor.....	City of Windsor	19	.....	.....	†3	4	26	2	.....	6	59	11,568 00	4,771 81	4,771 79
	Sandwich	4	.....	.....	1	1	6	2	.....	.....	5	1,985 00	818 81	818 82
	Walkerville	3	.....	.....	1	.....	4	.....	1	.....	7	1,501 50	619 36	619 37
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	26	.....	.....	5	5	36	4	1	6	71	15,054 50	6,209 98	6,209 98

* Local Option. †One for previous year.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
												$ c.	$ c.	$ c.
East York....	Scarborough	4	.....	.....	.....	2	6	.....	.....	.....	.....	700 00	175 00	175 00
	*Markham, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	York, east of Yonge Street	3	.....	.....	.....	1	4	.....	.....	.....	.....	410 00	102 50	102 50
	Markham, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	125 00	125 00
	*Richmond Hill, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*North Toronto, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Stouffville, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50 00	.....	.....
	Totals	9	.....	.....	.....	3	12	.....	.....	.....	.....	1,660 00	402 50	402 50
North York...	Aurora, Town	3	.....	.....	.....	.....	3	.....	.....	.....	3	1,056 00	316 80	316 80
	*Holland Landing, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*North Gwillimbury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*King	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*East Gwillimbury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Whitchurch	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Newmarket, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Georgina	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	36 00	36 00
	Sutton, Village	2	†1	.....	.....	.....	3	.....	.....	.....	.....	593 75	178 13	678 12
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	6	1	.....	.....	.....	7	.....	.....	.....	3	1,769 75	530 93	530 92

*Local Option. †6 months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Concluded.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West York....	York, west of Yonge Street....	3	.....	.....	.....	1	4	1	.....	.....	.....	440 00	110 00	110 00
	*Vaughan.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Etobicoke.....	2	.....	1	.....	.....	3	.....	.....	.....	.....	300 00	75 00	75 00
	Woodbridge, Village.....	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	125 00	125 00
	*Weston, Village.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Mimico, Village.....	1	.....	.....	.....	.....	1	.....	.....	1	.....	250 00	62 50	62 50
	New Toronto, Village.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	62 51	62 50
	Transferred from previous year.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	" " Local Option.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69 95	.....	.....
	Totals.....	9	.....	1	.....	1	13	1	.....	1	.....	1,809 95	435 01	435 00
	Grand Totals.....	1,219	†7	32	211	64	1,533	28	6	148	1,986	814,666 21	323,777 82	355,417 42

*Local Option.

† 2 for 6 months.

SCHEDULE B.—ADDENDA.

Showing amounts collected under Municipal By-Laws for taverns and shop licenses in excess of Statutory Duties.

License District.	Municipality.	Number of Licenses.	Amount of Excess.
			$ c.
Algoma	Massey	2	900 00
	Blind River	3	750 00
Brockville	Brockville	8	1,890 00
Dundas	Chesterville	2	20 00
Durham, East	Port Hope	8	160 00
Elgin, East	Port Stanley	2½	25 00
Essex, North	Tilbury, N.	2	160 00
Essex, South	Essex	1½	25 00
	Amherstburg	3	750 00
Fort William	Paipoonge	1	80 00
Hastings, East	Hungerford	2	10 00
Hastings, North	Madoc	2	20 00
Kent, East	Dresden	2	40 00
Kent, West	Tilbury	3	300 00
Lambton, West	Sombra	5	25 00
	Courtright	1	150 00
Leeds	Escott, Front	½	40 00
	Gananoque	5½	675 00
Middlesex, North	Biddulph	1	15 00
Middlesex, West	Glencoe	2	20 00
Nipissing	Mattawa	4	80 00
Ontario, South	Oshawa	4	80 00
Parry Sound, West	Christie	1	30 00
	Parry Sound	3	1,250 00
	Foley	1	80 00
Rainy River	Emo	1	30 00
	Fort Frances	4	80 00
	Rainy River	3	60 00
	Dilke	1	80 00
Russell	Gloucester	3	30 00
	Russell	6	180 00
Simcoe, Centre	Flos	4	120 00
Stormont	Finch	2	60 00
	Cornwall	10	2,000 00
	do Tp.	4	920 00
Sturgeon Falls	Springer	1	45 00
	Caldwell	2	90 00
	Rutter and Dunnett	2	40 00
Sudbury	Chapleau	2	140 00
	Drury, D. and G.	1	70 00
Temiskaming	Haileybury	3	550 00
	Englehart	2	825 23
	Cochrane	2	800 00
Welland	Bertie	6	30 00
Wellington, West	Harriston	3	60 00
	Palmerston	3	60 00
York, East	Scarborough	4	120 00

SCHEDULE C.

STATEMENT of the amounts distributed for Fines and Transfers from each License District for the license year 1915-16.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Addington	100 00	.....
Algoma	1,280 00	252 02
Brant, North	169 00	.....
Brant, South	241 00	166 67
Brockville	100 00	.....
Bruce, Centre	.....	40 00
Bruce, North	127 00	200 01
Bruce, South	274 00	80 00
Carleton	.....	.....
Dufferin ..... (See Local Option)	.....	.....
Dundas	85 00	.....
Durham, East	.....	123 34
Durham, West	.....	.....
Elgin, East	120 00	.....
Elgin, West	564 00	166 67
Essex, North	1,725 00	413 32
Essex, South	459 00	640 00
Fort William	10 00	.....
Frontenac	.....	.....
Glengarry .....(See Local Option)	.....	.....
Grenville	230 00	.....
Grey, Centre	360 00	.....
Grey, North ..... (See Local Option)	.....	.....
Grey, South	67 00	163 33
Haldimand	80 00	.....
Haliburton	.....	.....
Halton	469 70	40 00
Hamilton	320 00	1,133 34
Hastings, East	275 00	391 68
Hastings, North	103 20	.....
Hastings, West	720 00	1,237 33
Huron, Centre	.....	.....
Huron, North	.....	.....
Huron, South	.....	.....
Kenora	311 00	206 70
Kent, East	165 00	200 01
Kent, West	1,217 00	373 32
Kingston	290 00	333 34
Lambton, East	110 00	.....
Lambton, West	140 00	291 68
Lanark, North	287 00	.....
Lanark, South	355 00	266 67
Leeds	212 00	.....

SCHEDULE C.—Continued.

STATEMENT of the amounts distributed for Fines and Transfers from each License District for the license year 1915-16.

License District.	Amounts received for Fines.	Amount received for Transfers.
	$ c.	$ c.
Lennox	59 00	506 68
Lincoln	150 00	.....
London	650 00	.....
Manitoulin	714 00	.....
Middlesex, East	60 00	.....
Middlesex, North	445 00	.....
Middlesex, West	.....	.....
Monck	80 00	.....
Muskoka	145 00	233 32
Nipissing	157 86	333 34
Norfolk, North	149 00	116 67
Norfolk, South	90 00	.....
Northumberland, East	155 00	83 34
Northumberland, West	50 00	.....
Ontario, North, No. 1	139 00	.....
Ontario, North, No. 2	.....	.....
Ontario, South	274 00	83 33
Ottawa	350 00	1,600 00
Oxford, North	270 00	40 00
Oxford, South	55 00	.....
Parry Sound, East	164 00	123 34
Parry Sound, West	700 00	.....
Peel	C.T.A.	.....
Perth, North	217 98	.....
Perth, South	447 00	.....
Peterborough, East	20 00	.....
Peterborough, West	10 00	666 68
Port Arthur	295 00	166 67
Prescott	1,068 00	353 22
Prince Edward	287 00	.....
Rainy River	330 00	.....
Renfrew, North	302 00	66 68
Renfrew, South	762 00	.....
Russell	251 50	330 00
Sault Ste. Marie	2,254 00	833 35
St. Catharines	134 00	666 64
Simcoe, Centre	245 00	200 00
Simcoe, East	210 00	58 34
Simcoe, South	30 00	83 34
Simcoe, West (see Local Option)	.....	.....
Stormont	85 00	216 67
Sturgeon Falls	223 65	460 01
Sudbury	2,190 00	273 33
Temiskaming	15,794 00	490 02
Toronto	1,675 00	4,266 65
Victoria, East	45 00	.....
Victoria, West	206 55	300 00

SCHEDULE C.—Concluded.

STATEMENT of the amounts distributed for Fines and Transfers from each License District for the license year 1915-16.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Waterloo, North	210 00	80 00
Waterloo, South	430 00	.....
Welland	4,902 00	157 67
Wellington, East	70 00	416 73
Wellington, South	74 60	.....
Wellington, West	230 00	263 34
Wentworth, North	.....	116 67
Wentworth, South	100 00	40 00
Windsor	2,537 00	1,000 02
York, East	.....	.....
York, North	20 00	.....
York, West	.....	83 34
Totals	51,214 04	21,226 81

SCHEDULE D.

STATEMENT, showing the amounts paid for expenses of Commissioners, salaries of Inspectors, office rent, postage, stationery, printing, advertising and legal expenses for the license year 1915-16, in each license district.

	$ c.
Addington	839 67
Algoma	1,861 80
Brant, North	700 63
Brant, South	1,779 85
Brockville	972 09
Bruce, Centre	606 49
Bruce, North	756 35
Bruce, South	877 72
Carleton	689 55
Dufferin	L.O.
Dundas	612 06
Durham, East	888 19
Durham, West	292 45
Elgin, East	759 72
Elgin, West	1,614 46
Essex, North	2,099 87
Essex, South	978 72
Fort William	1,729 77
Frontenac	528 27
Glengarry	L.O.
Grenville	644 74
Grey, Centre	702 22
Grey, North	L.O.
Grey, South	772 03
Haldimand	827 72
Haliburton	120 83
Halton	849 05
Hamilton	6,934 29
Hastings, East	908 73
Hastings, North	836 24
Hastings, West	1,840 90
Huron, Centre	C. T. A. .....
Huron, North	" .....
Huron, South	" .....
Kenora	1,647 50
Kent, East	.....
Kent, West	1,910 37
Kingston	1,699 47
Lambton, East	820 16
Lambton, West	1,552 82
Lanark, North	935 45
Lanark, South	1,267 65
Leeds	934 44
Lennox	767 67
Lincoln	992 38
London	2,926 50
Manitoulin	88 05
Middlesex, East	709 50
Middlesex, North	723 17
Middlesex, West	795 46
Monck	632 77
Muskoka	864 34

SCHEDULE D.—Concluded.

Statement, etc.—*Concluded.*

	$ c.
Nipissing	1,387 01
Norfolk, North	722 31
Norfolk, South	604 08
Northumberland, East	519 54
Northumberland, West	1,007 07
Ontario, North No. 1	539 12
do No. 2	363 25
Ontario, South	1,171 28
Ottawa	6,698 69
Oxford, North	977 31
Oxford, South	726 18
Parry Sound, East	959 54
Parry Sound, West	965 86
Peel C. T. A.	.....
Perth North	1,347 63
Perth South	894 20
Peterborough, East	668 21
Peterborough, West	1,576 06
Port Arthur	2,025 36
Prescott	1,357 12
Prince Edward	769 01
Rainy River	1,287 25
Renfrew, North	1,315 95
Renfrew, South	1,019 86
Russell	1,390 50
Sault Ste. Marie	1,846 27
St. Catharines, City	1,641 00
Simcoe, Centre	1,135 88
Simcoe, East	1,143 39
Simcoe, South	649 48
Simcoe, West	.....
Stormont	1,644 59
Sturgeon Falls	714 11
Sudbury	1,992 57
Temiskaming	3,459 92
Toronto	17,973 05
Victoria, East	326 40
Victoria, West	1,579 75
Waterloo, North	1,544 85
Waterloo, South	1,009 63
Welland	2,676 04
Wellington, East	841 29
Wellington, South	1,522 99
Wellington, West	814 04
Wentworth, North	680 58
Wentworth, South	561 80
Windsor	2,564 14
York, East	741 14
York, North	701 06
York, West	976 20
Total	132,155 43

RECAPITULATION

OF

RECEIPTS AND EXPENDITURES,

1915-16.

	$ c.	$ c.
Total Receipts for Licenses, Schedule "B"	814,666 21	
" " " Fines, " "C"	51,214 04	
" " " Transfers, " "C"	21,226 81	
		887,107 06
Paid to Municipalities, Schedule "B"	323,777 82	
" Province, " "B"	355,417 42	
" " " "C"	72,440 85	
" for Inspectors' Salaries, Commissioners and Office Expenses Schedule "D"	132,155 43	
" Balances transferred to 1916-17	3,315 54	
		887,107 06

SCHEDULE E.

Giving names and addresses of holders of Distiller's, Brewer's, Brewer's Warehouse, Sample and Wholesale licenses for 1915-16.

DISTILLERS.

Corby, H., Distilling Co., Limited, Belleville.
General Distillery Co., Limited, Toronto.
Gooderham & Worts, Limited, Toronto.
Hamilton Distillery Co., Hamilton
Maclaren, John A., Estate of, Perth.
Spalding & Stewart, Perth.
Seagram, Joseph E., Waterloo.
Walker & Sons Co., The Hiram, Limited, Walkerville.
Wiser & Sons, The Jos., Limited, Prescott.

BREWERS.

Arscott, John, Walkerton.
Berlin Lion Brewery, Limited, Kitchener.
Bernhardt, V. P., Preston.
Bixwell Brewing and Malting Co., Brantford.
Bowie & Co.'s Brewery, Limited, Brockville.
Brading Brewing Co., Limited, Ottawa.
British American Brewing Co., Limited, Windsor.
Calcutt Brewing and Malting Co., Limited, Peterborough.
Carling Brewing and Malting Co., Limited, London.
Capital Brewing Co., Limited, Ottawa.
Copland Brewing Co., Limited, Toronto.
Cosgrave Brewery Co., Limited, Toronto.
Cronmiller & White Brewing and Malting Co., Limited, Port Colborne.
Devlin, Felix, Stratford.
Diamond Brewery Co., Limited, Port Arthur.
Dominion Brewing Co., Limited, Toronto.
Fisher, John, Portsmouth.
Grant Spring Brewing Co., Limited, Hamilton.
Hamilton, Joseph, London.
Heisz & Tiede, Formosa.
Holliday, W. R., Guelph.
Heuther, Jacob C., Neustadt.
Hamilton Brewing Association, Limited, Hamilton.
Kakabeka Falls Brewing Co., Fort William.
Korman Brewery, The, Toronto.
Kuntz Brewery, Limited, The, Waterloo.
Labatt, Limited, John, London.
Lakewood Brewery Co., Kenora.
McCarthy, Sons & Co., Limited, Prescott.
O'Keefe Brewery Co., of Toronto, Limited, Toronto.
Raw, Mary, New Hamburgh.
Reinhardt Salvador Brewery, Ltd., Toronto.
Roy, James, A., Belleville.
Rudolph & Begg, St. Thomas.
Schwan, Veronica, Carlsruhe.
Soo Falls Brewing Co., Limited, Sault Ste. Marie.
Stevenson, Robert, Kingston.
Sudbury Brewing and Malting Co., Limited, Sudbury.
St. Lawrence Brewery, Limited, Cornwall.
Geo. Sleeman, Guelph, 4 months.
Taylor & Bates, St. Catharines.
Walkerville Brewing Co., Limited, Walkerville.
Watson, John Listowel.
Wright, Alfred J., Orillia, 6 months.

BREWERS' WAREHOUSES.

BARRIE.....	The Kuntz Brewery, Limited.
BELLEVILLE.....	Berlin Lion Brewery Limited.
	Grant Spring Brewing Co.
KITCHENER.....	Hamilton Brewing Association, Limited.
BRANTFORD.....	O'Keefe Brewery Co., Limited.
	Walkerville Brewing Co., Limited.
BROCKVILLE.....	Capital Brewing Co., Limited.
	Hamilton Brewing Association, Limited.
COBOURG.....	O'Keefe Brewery Co., of Toronto, Limited.
	Reinhardt Salvador Brewery, Limited.
CHATHAM.....	John Labatt, Limited.
	British American Brewing Co.
FORT WILLIAM .	Reinhardt Salvador Brewery Limited.
	Soo Falls Brewing Co., Limited.
	Diamond Brewery Co., Limited.
GUELPH.....	The Kuntz Brewery, Limited.
HAMILTON.....	Carling Brewing and Malting Co., of London, Limited.
	Dominion Brewing Co.
	John Labatt, Limited.
	The Kuntz Brewery, Limited.
	Felix Devlin.
	Berlin Lion Brewery, Limited.
LINDSAY.....	The Kuntz Brewery, Limited.
NIAGARA FALLS..	Reinhardt Salvador Brewery, Limited.
	Taylor & Bates.

SCHEDULE E.—Concluded.

BREWERS' WAREHOUSES.—*Continued.*

OTTAWA.....	John Labatt, Limited.
	O'Keefe Brewery Co., of Toronto, Limited.
	Grant Spring Brewing Co., Limited.
	Hamilton Brewing Association, Limited.
	Berlin Lion Brewery, Limited.
PERTH.....	O'Keefe Brewery Co.
PENETANGUISHENE	Carling Brewing & Malting Co., of London, Limited.
	The Kuntz Brewery, Limited.
PARRY SOUND....	do.
PORT ARTHUR....	Soo Falls Brewing Co.
	Kakabeka Falls Brewing Co.
SMITH'S FALLS..	O'Keefe Brewery Co.
STRATFORD.....	The Kuntz Brewery,
	Berlin Lion Brewery, Limited.
SUDBURY.....	The Kuntz Brewery, Limited.
SAULT STE. MARIE.	Walkerville Brewing Co., Limited.
	Sudbury Brewing Co.
	Kakabeka Falls Brewing Co.
TORONTO.....	Carling Brewing and Malting Co., of London, Limited.
	John Labatt, Limited.
	Berlin Lion Brewery, Limited.
	Hamilton Brewing Association.
	The Kuntz Brewery, Limited.
TRENTON.....	Berlin Lion Brewery, Limited.
WOODSTOCK.....	The Kuntz Brewery, Limited.

WHOLESALE LICENSES.

KITCHENER.....	Randall & Roos.
HAMILTON.....	J. Turner & Co.
	Hamilton Importing Co., Limited.
EGANVILLE	W. George, 6 months.
KINGSTON.....	Gillespie & Co., of Montreal.
LONDON.....	Garvey, John, & Sons.
OTTAWA.....	Grant, Jos.
	Major, S. J., Ltd.
	National Breweries Ltd. of Quebec.
	Major & Soubliere, Limited.
	Jno. Labatt, Limited.
NEW YORK.....	W. A. Ross, & Bro., Inc.
SAULT STE MARIE.	Geo. A. McNally.
TORONTO.....	Calvert, J. H.
	Ciceri, Chas. A.
	Edwards, F., & Co.
	Foy & Co., Geo. J., Limited.
	Howard, R. H., & Co.
	Perkins, Ince & Co.
	Roblin, D. O.
	Todd, J. D.
MONTREAL.....	Hudon, Hebert & Cie.
	Robertson, J., & Co., Limited.
	St. Charles, F. X., & Co.
	Chaput, Fils, et Cie.
	Molsons Brewery, Ltd.
	Bolvin, Wilson & Co.
	Hill, Thompson & Co.
	J. Hope & Co.

SAMPLE AND COMMISSION LICENSES.

And. Gorrie.....	(Meagher Bros. & Co., Montreal.)
J. K. Oswald....	(Law, Young & Co., Montreal.)
R. A. Kelley.....	(J. M. Douglass & Co., Montreal.)
Thos. Kirkwood.	(W. C. Wonham & Sons, Montreal.)
J. A. Taylor.....	Montreal.
P. G. Malagordi.	Montreal
W. G. Reid.....	Hamilton.
W. D. Erwin.....	(Christopher & Co., London, Eng.).
F. S. Ball	Toronto.
D. M. O'Meara..	(L. A. Wilson & Co., Montreal).

Stroh Brewery Co. (Detroit).
Goebel Brewing Co. ..... (Detroit).
M. Haupt.....(Montreal).

SCHEDULE F.—Showing Statutory Duties payable for tavern, shop and wholesale licenses in the Province of Ontario.

In a city having a population of more than 200,000:

For a tavern license	$1,600
For a shop license	1,600

In a city having a population of more than 100,000 and less than 200,000:

For a tavern license	$1,200
For a shop license	1,000

In a city having a population of more than 30,000 and not more than 100,000:

For a tavern license	$700
For a shop license	700

In a city or town having a population of more than 10,000 and not more than 30,000:

For a tavern license	$500
For a shop license	500

In a city having a population of 10,000 or less and in a town having a population of more than 5,000 and not more than 10,000:

For a tavern license	$450
For a shop license	450

In a town or incorporated village having a population of more than 2,000 and not more than 5,000:

For a tavern license	$350
For a shop license	350

In a town or incorporated village having a population of 2,000 or less:

For a tavern license	$250
For a shop license	270

In a township:

For a tavern license	$120
For a shop license	200

Provided that in any locality in a Provincial Judicial District other than an incorporated city, town or village there shall be payable:

For a tavern license	$120

And provided that in a city, town, village, or other municipality, or a locality without municipal organization in a Provincial Judicial District, there shall be payable:

For a shop license	$500

For a beer and wine license a fee of three-fourths of that imposed for a tavern license in the municipality or unorganized district in which the beer and wine license is issued.

For each wholesale license	$500
For each sample and commission license	300

For every transfer of a tavern or shop license a fee amounting to one-third of the fee payable for the license transferred.

Provided that the Lieutenant-Governor in Council may increase the duties payable for tavern or shop licenses in any Provincial Judicial District or in any municipality or locality situated therein to such an amount as may be deemed proper, and such increase shall take effect as may be directed by Order-in-Council or from date of the publication thereof in the *Ontario Gazette*.

In addition to above fees for tavern licenses there shall be paid a sum equal to five per cent. on all daily sales of liquor and receipts of the bar in excess of $60.00 in cities of 100.000 population and over, and in excess of $50.00 in all other municipalities.

SCHEDULE G.

Showing municipalities in which Local Option is in force in 1916.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Addington	Kennebec	Tp.	L.O.	1909	308	181	42	139	1	
	Oso	"	"	1912	228	136	68	68	2	
	Newburg	Vil.	"	1911	193	81	54	27	1	Car.'14, mj. 64
	Hinchinbrooke	Tp.	"	1911	399	185	114	71	2	
	Camden, E.	"	"	1911	1,346	620	332	288	7	
	Palmerston	"	"	1915	186	74	45	29	1	
Algoma	Johnson	"	"	1905	296	109	61	48	..	
	MacDonald, Meredith and Aberdeen	"	"	1905	249	101	33	68	..	
	Thessalon	"	"	1906	212	77	28	49	..	
	Bruce Mines	Vil.	"	1910	199	86	51	35	2	
	*Tarbutt & Tarbutt, add'l	Tp.	"	1905	.....	.....	.....	.....	..	
Brant, North	Onondaga	"	"	1907	361	152	91	61	2	Car.'10, mj. 147
	Brantford	"	"	1910	2,137	999	521	478	3	
	Burford	"	"	1910	1,574	728	449	279	2	
	Dumfries, S	"	"	1910	837	356	234	122	2	
Brant, South	Oakland	"	"	1910	348	194	91	103	1	
Brockville	Yonge & Escott, R	"	"	1909	438	264	95	169	2	
	Athens	Vil.	"	1909	328	179	85	94	2	Car. '12, mj. 70
	Elizabethtown	Tp.	"	1911	1,460	590	368	222	1	
Bruce, Centre	Huron	"	"	1907	1,019	529	197	332	2	
	Kincardine'	"	"	1910	777	407	127	280	1	
	Chesley	Vil.	"	1910	553	267	176	91	3	Car. '13, mj. 17
	Paisley	"	"	1911	288	138	75	63	3	
	Kincardine	Town	"	1913	677	296	195	101	6	
Bruce, North	Amabel	Tp.	"	1906	940	295	219	76	1	Car.'09, mj. 236
	Southampton	Vil.	"	1906	518	233	157	76	2	" '09, " 48
	Tara	"	"	1906	215	89	76	13	2	" '09,'12 &'15
	Bruce	Tp.	"	1907	962	300	149	151	1	" '10, mj. 283
	Arran	"	"	1907	761	372	196	176	1	
	Saugeen	"	"	1907	508	232	153	79	1	
	Eastnor	"	"	1910	468	261	122	139	3	Car.'13, mj. 50
	Lindsay	"	"	1910	219	84	28	56	..	
	Tiverton	Vil.	"	1913	103	72	26	46	1	
	Albemarle	Tp.	"	1914	425	151	91	60	1	
Bruce, South	Teeswater	Vil.	"	1910	286	160	87	73	3	Car. '15, mj. 14
	Kinloss	Tp.	"	1912	672	321	135	186	1	
	Lucknow	Vil.	"	1912	315	209	70	139	3	
Carleton	Goulburn	Tp.	"	1907	810	353	212	141	2	Car.'11, mj. 34
	Huntley	"	"	1907	660	286	112	174	2	
	March	"	"	1907	332	145	88	57	2	Car. '10, mj. 72
	Torbolton	"	"	1910	312	114	75	39	..	
	Nepean	"	"	1910	1,810	709	361	348	..	
	North Gower	"	"	1913	643	297	191	108	3	Car. '16, mj. 15
	Fitzroy	"	"	1916	626	309	178	131	1	
Dufferin	Amaranth	"	"	1894	878	215	80	135	1	
	E. Garafraxa	"	"	1895	618	201	157	44	1	Car. '07,mj. 100
	E. Luther	"	"	1893	639	311	186	125	2	
	Melancthon	"	"	1898	1,145	413	234	179	2	
	Mulmur	"	"	1908	1,020	461	198	263	2	
	Mono	"	"	1910	.....	509	112	397	..	
	Orangeville	Town.	"	1914	830	383	250	133	6	Car. '13, mj. 89
	Shelburne	Vil.	"	1910	365	203	112	91	3	
	Grand Valley	"	"	1910	229	117	69	48	2	

*Township separated from Johnson, etc., in 1912.

SCHEDULE G.—*Continued.*

Showing municipalities in which Local Option is in force in 1916—Continued.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Dundas	Mountain	Tp.	L.O.	1906	411	286	125	161	2	Car.'09, mj. 290
	Winchester	Vil.	"	1907	374	198	83	115	2	
	Iroquois	"	"	1909	376	183	94	89	2	Car. '13, mj. 87
	Matilda	Tp.	"	1914	1,175	544	191	383	0	
Durham East	Cavan	"	"	1905	1,015	256	71	185	2	
	Hope	"	"	1906	.....	358	307	51	1	Car.'09, mj. 339
	Manvers	"	"	1907	1,118	529	213	316	2	
	Millbrook	Vil.	"	1908	327	202	82	120	3	
Durham, West.	Clarke	Tp.	"	1905	1,368	641	189	452	2	
	Cartwright	"	"	1904	559	284	111	173	1	
	Darlington	"	"	1900	1,295	438	73	365	1	
	Bowmanville	Town.	"	1909	908	456	233	223	3	
Elgin, East	Yarmouth	Tp.	"	1905	1,770	663	508	155	4	Car.'08, mj, 240
	Malahide	"	"	1909	1,280	662	241	421	..	
	Bayham	"	"	1914	1,035	536	280	256	1	
Elgin, West	Southwold	"	"	1906	1,348	536	315	221	4	
	Rodney	Vil	"	1911	260	136	80	56	2	
	Aldborough	Tp.	"	1911	1,296	580	330	250	1	
	Dutton	Vil.	"	1913	323	141	89	52	2	
	Dunwich	"	"	1913	1,100	559	175	384	2	
	West Lorne	"	"	1915	216	130	60	70	..	
Essex, North	Sandwich, South	Tp.	"	1910	515	254	111	143	2	
Essex, South	North Colchester	"	D.A.	.....	.....	.....	.....	.....	..	
	South Gosfield	"	L.O.	1907	658	313	173	140	1	B. and W.
	Mersea	"	"	1907	1,373	646	319	327	1	
	Tilbury, W	"	"	1910	514	264	166	98	3	Car. '14, mj. 33
	Colchester, S	"	"	1910	823	410	173	237	1	
	Kingsville	Town	"	1910	491	257	140	117	2	
	Leamington	"	"	1910	822	444	213	231	3	
	Essex	"	"	1916	419	214	135	79	2	
Frontenac	Kingston	Tp.	"	1906	1,040	349	301	48	5	
	Storrington	"	"	1892	614	233	195	38	3	
	Portland	"	"	1907	926	433	189	244	3	Car.'10, mj. 295
	Pittsburgh	"	"	1908	775	275	174	101	3	
	Kennebec	"	"	1909	308	181	42	139	1	
	Loughboro'	"	"	1911	753	343	204	139	2	
	Bedford	"	"	1913	379	157	74	83	1	
Glengarry	Charlottenburgh	"	"	1910	1,390	573	362	211	5	Ca. '14, mj. 347
	Kenyon	"	"	1911	1,240	596	255	341	4	" " 322
	Lancaster	Vil.	"	1911	205	115	58	57	2	" " 41
	Lochiel	Tp.	"	1911	1,178	556	277	279	2	" " 324
	Maxville	Vil.	"	1911	271	149	64	85	1	" " 50
	Alexandria	Town	"	1911	456	224	120	104	3	" " 90
	Lancaster	Tp.	"	1914	986	429	240	189	1	
Grenville	Cardinal	V	"	1905	314	121	117	7	2	Car. '08, mj. 77
	Oxford	Tp.	"	1910	975	414	255	159	2	" '14 " 152
	Augusta	"	"	1910	1,200	491	308	183	2	
	Wolford	"	"	1911	570	283	153	130	1	
	Kemptville	Vil.	"	1914	350	220	109	111	2	
Grey, Centre	Euphrasia	Tp.	"	1905	1,218	332	276	56	1	
	Artemesia	"	"	1906	1,148	521	212	309	6	
	Collingwood	"	"	1906	1,127	394	313	81	..	Car. '09 & '12
	Osprey	"	"	1906	1,003	379	273	106	2	
	Thornbury	Town	"	1906	278	120	89	31	2	Car.'09 '12 & '15
	Holland	Tp.	"	1910	1,049	397	224	173	2	
	*Flesherton	Vil.	"	1906	.....	.....	.....	.....	..	

*Part of Artemesia Township when L.O. carried.

SCHEDULE G.—*Continued.*

Showing municipalities in which Local Option is in force in 1916.—*Continued.*

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Grey, North ...	Sarawak	Tp.	D.A.	.....	.....	.....	.....	.....	..	
	Derby	"	L.O.	1906	632	335	80	255	..	
	Keppel.....	"	"	1906	1,134	441	161	355	2	
	Owen Sound.....	Town	"	1906	2,300	1,238	762	438	13	Car. '9, '12, '13
	Sydenham	Tp.	"	1906	1,170	686	238	448	3	& '16.
	*Shallow Lake	Vil.	"	1906	.....	.....	.....	.....	..	Car. '15, mj. 15
	Meaford	Town	"	1914	.....	484	316	148	3	
Grey, South ...	Egremont	Tp.	"	1906	995	504	206	298	1	Car. '09, mj. 360
	Proton	"	"	1907	827	456	227	229	3	
	Durham	Town	"	1908	666	297	179	118	3	Car. '12, & '15
	Dundalk	Vil.	"	1910	264	132	85	47	3	" '13, 1 agst
	Bentinck	Tp.	"	1910	1,048	377	234	143	2	" " mj. 81
Haliburton	Dysart	Tp.	L.O.	1910	370	162	78	84	1	Car. '14, mj. 84
	Glamorgan	"	"	1912	98	59	24	35	1	
	Shelbourne.....	"	"	1916	.....	23	12	11	1	
Haldimand	Seneca.....	"	"	1909	600	317	170	147	2	
	Walpole	"	"	1912	1,146	424	78	346	3	
	Jarvis.....	Vil.	"	1915	148	86	44	42	1	
Halton	Nassagaweya.....	Tp.	"	1906	686	330	156	174	1	
	Trafalgar	"	"	1906	1,176	272	174	98	1	Car. '09, mj. 49
	Nelson	"	"	1910	1,112	463	175	288	..	
Hastings, East.	Tweed	Vil.	"	1909	413	213	124	89	4	Car. '14, mj. 61
	Thurlow	Tp.	"	1909	1,600	705	443	162	4	
	Huntingdon.....	"	"	1906	790	416	149	267	..	Car. '07, mj. 75
Hastings, North	Madoc	"	"	1902	.....	432	195	237	2	
	Rawdon	"	"	1902	.....	272	169	103	3	
	Stirling	Vil.	"	1908	283	151	86	65	3	
	Limerick	Tp.	"	1909	117	45	5	40	1	
	Tudor.....	"	"	1909	252	117	61	56	1	
	Wollaston	"	"	1909	213	128	21	107	1	
	Faraday	"	"	1910	234	101	49	52	..	
	Dungannon	"	"	1910	247	102	54	48	1	
	Marmora	"	"	1914	380	191	113	78	1	
Hastings, West.	Sidney	"	"	1909	1,633	855	322	533	4	
Kent, East	Camden	"	"	1905	886	295	252	43	1	Car. '08, mj. 116
	Orford	"	"	1910	956	487	247	240	1	
	Blenheim.....	Town	"	1912	400	223	126	97	3	
	Howard	Tp.	"	1912	1,157	445	281	164	1	
	Harwich	"	"	1915	1,683	781	448	333	..	
Kent, West	Raleigh	"	"	1904	1,645	522	463	59	2	Car. '07, mj. 113
	Tilbury, E	"	"	1891	889	323	152	171	4	
	Wallaceburg	Town	"	1916	1,130	535	315	184	6	
Lambton, East.	Arkona	Vil.	"	1906	170	72	49	23	2	Car. '09, mj. 14
	Euphemia	Tp.	"	1906	650	243	225	17	3	" " " " 245
	Warwick	"	"	1906	1,049	471	189	282	..	
	Wyoming.....	Vil.	"	1909	242	132	65	67	3	Car. '12, mj. 66
	Brooke.....	Tp.	L.O.	1910	1,088	541	214	327	1	
	Plympton	"	"	1911	1,132	392	140	252	1	
	Bosanquet	"	"	1912	719	325	187	135	1	
	Forest	Town	"	1913	528	266	167	99	2	
Lambton, West.	Dawn	Tp.	"	1905	.....	371	300	71	1	
	Enniskillen.....	"	"	1906	650	243	226	17	4	
	Moore	"	"	1906	1,483	586	455	131	8	Car. '09, mj. 300
	Sarnia	"	"	1906	749	351	147	204	1	

*Part of Keppel Township when L.O. carried

SCHEDULE G.—*Continued.*

Showing municipalities in which Local Option is in force in 1916.—Continued.

License District.	Municipality.	Status	Dunkin Act or Local Option	Year of passing	No. of voters on list	Vote for.	Against	Majority for.	No. of licenses cut off	Remarks.
Lambton, West— Continued.—	Oil Springs	Vil.	L.O.	1916	181	104	52	52	2	
	Petrolia	Town	"	1916	1,101	445	292	153	6	
	Sombra	Tp.	"	1916	1,000	517	320	197	5	
Lanark, North	Lanark	Tp.	"	1890	449	149	42	107	2	Car. '07, mj. 336
	Dalhousie	"	"	1906	508	249	124	125	1	
	Almonte	Town	"	1910	781	327	187	140	4	Car. '13, mj.
	Beckwith	Tp.	"	1910	496	208	65	143	1	agst 33
	Pakenham	"	"	1910	510	274	140	134	3	
	Ramsey	"	"	1910	688	332	173	159	..	
	Lanark	Vil.	"	1914	202	110	59	51	2	
	Carleton Place	Town.	"	1916	.....	465	289	176	3	
Lanark, South	S. Sherbrooke	Tp.	"	1907	260	107	59	48	1	
	Drummond	"	"	1913	495	265	124	141	2	
Leeds	Leeds and Lansdowne Front	"	"	1900	1,203	411	338	73	1	Car.'07, mj. 336
	Leeds and Lansdowne Rear	"	"	1910	729	361	214	147	2	
	Newboro'	Vil.	"	1913	113	65	35	30	2	Car. '16, mj. 36
	Bastard and B.	Tp.	"	1914	800	422	249	173	..	
	Yonge, Front	"	"	1916	400	274	67	207	..	
Lennox	Richmond	Vil.	"	1907	824	401	145	256	1	
	Ernestown	Tp.	"	1910	1,105	519	320	199	3	
	Amherst Island	"	"	1916	222	150	49	101	1	
	Bath	Vil.	"	1916	94	59	25	34	1	
Lincoln	Niagara	Tp.	"	1904	734	224	208	16	3	Car. '07 and '10
	Beamsville	Vil.	"	1906	....	109	103	6	3	" '09 " '12
	Grimsby, N.	Tp.	"	1906	653	202	101	101		" '10 mj. 48
	Grimsby, S.	"	"	1906	518	179	149	30	2	" '10 " 142
	Clinton	"	"	1906	.....	265	70	195	..	" '09 " 31
Middlesex, E.	Nissouri, W.	"	"	1907	890	415	203	212	3	
	Dorchester, N.	"	"	1910	1,184	554	354	200	4	
	Westminster	"	"	1910	1,870	824	482	342	3	
	London	"	"	1916	2,640	927	218	709	5	
Middlesex, N.	E. Williams	"	"	1905	619	193	168	25	2	
	Adelaide	"	"	1910	750	425	157	268	2	Car. '13, mj 141
	Ailsa Craig	Vil.	"	1910	243	146	58	88	2	
	Strathroy	Town	"	1910	1,010	477	309	168	5	Car. '13, mj. 163
	Biddulph	Tp.	"	1916	625	315	194	121	1	
	Lucan	Vil.	"	1916	231	133	75	58	1	
Middlesex, W.	Caradoc	Tp.	"	1909	1,148	605	297	308	3	" '13, mj. 303
	Lobo	"	"	1910	1,050	409	237	172	2	
	Ekfrid	"	"	1912	850	377	218	159	2	
	Delaware	"	"	1913	450	255	130	125	1	
	Wardsville	Vil.	"	1913	90	58	28	30	..	
	Newbury	"	"	1915	106	61	34	27	1	
Monck	Gainsboro'	Tp.	"	1893	893	385	202	183	2	Car. '09, mj. 232
	Pelham	"	D.A.	.....	.....	.....	.....	.....	..	
	Caistor	"	L.O.	1908	571	270	114	156	1	
	Wainfleet	"	"	1910	1,013	419	204	215	1	
Muskoka	McLean and Ridout	"	"	1904	229	74	59	15	2	Car. '07, '10 & '13
	Morrison	"	"	1906	.....	111	35	76	1	
	Port Carling	Vil.	"	1907	130	50	28	22	1	Car. '10, mj 9
	Brunel	Tp.	"	1908	150	100	26	74	..	
	Bracebridge	Town.	"	1911	689	337	210	127	3	Car. '14, mj. 76
Nipissing	Jocelyn	Tp.	"	1907	208	61	15	46	..	
Norfolk, North.	Windham	"	"	1905	1,221	402	220	182	3	

SCHEDULE G.—*Continued.*

Showing municipalities in which Local Option is in force in 1916.—Continued.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Norfolk, North.	Waterford	Vil.	L.O.	1907	367	168	98	70	3	Car. '12, mj. 106
Norfolk, South.	Walsingham, N.	Tp.	"	1907	598	239	90	149	2	
	Charlotteville	"	"	1912	952	396	238	158	2	
	Walsingham, S.	"	"	1914	500	299	76	223	1	
	Port Rowan	Vil.	"	1914	270	148	77	71	3	
N'mberland, E.	Cramahe	Tp.	"	1907	1,026	525	218	307	1	
	Murray	"	"	1908	1,070	577	196	381	2	
	Seymour	"	"	1908	1,176	521	107	414	1	
	Brighton	Vil.	"	1908	641	316	150	166	2	
	Colborne	"	"	1908	407	206	101	105	3	Car. '12, mj. 72
	Campbellford	Town.	"	1908	798	372	241	131	4	
	Percy	Tp.	"	1912	964	493	272	221	2	Car. '15, mj. 18
N'mberland W.	Haldimand	Tp.	"	1906	1,412	473	386	87	1	
	S. Monaghan	"	"	1906	298	101	6	95	1	
	Hamilton	"	"	1908	1,284	575	273	302	5	
Ontario, North.	Scott	"	"	1906	748	251	214	37	2	
	Uxbridge	"	"	1910	1,021	420	237	183	3	
	Beaverton	Vil.	"	1911	343	169	111	58	2	Car. '14, mj. 76
	Cannington	"	"	1912	389	193	94	99	2	
	Brock	Tp.	"	1913	1,137	491	316	175	3	
Ontario, South,	Reach	"	"	1899	1,223	272	174	98	3	
	Pickering	"	"	1906	1,752	694	489	205	5	Car. '09, mj. 320
	Whitby	"	"	1910	680	306	195	111	2	
	Whitby, E.	"	"	1913	1,003	408	252	156	3	
	Port Perry	Vil.	"	1916	398	234	126	108	3	
	Uxbridge	Town.	"	1916	459	246	153	93	4	
Oxford, North..	E. Nissouri	Tp.	"	1906	899	338	311	27	1	
	Blenheim	"	"	1910	1,376	704	331	373	4	
	Embro	Vil.	"	1913	165	102	55	47	2	
Oxford, South..	E. Oxford	Tp.	"	1905	693	243	194	49	1	
	N. Oxford	"	"	1906	411	177	149	28	2	Car. '09, mj. 132
	Norwich, S	"	"	1907	825	333	215	118	2	
	Norwich	Vil.	"	1908	408	217	122	95	3	
	Ingersoll	Town	"	1913	1,507	773	455	318	7	
Parry Sound, W.	McDougall	Tp.	"	1891	130	30	9	21	..	Car. '07, mj. 6
	McKellar	"	"	1908	.....	70	33	37	..	
Perth, North...	Elma	"	"	1913	1,128	555	275	280	3	
Perth, South...	Fullerton	"	"	1907	701	346	172	174	1	Car. '13, mj. 177
	Downie	"	"	1910	908	417	249	168	3	
Peterboro'. E...	Dummer	"	"	1906	658	288	126	162	1	
	Otonabee	"	"	1906	1,011	376	181	195	1	
	Asphodel	"	"	1908	584	289	147	142	1	
	Norwood	"	"	1908	299	178	63	115	2	
	Havelock	Vil.	"	1909	485	217	86	131	3	
	Chandos	Tp.	"	1912	250	103	67	36	..	
	Lakefield	Vil.	"	1906	391	182	141	41	2	Car. '09 '12 & '15
Peterboro'. W..	Smith	Tp.	"	1905	900	429	271	158	4	
	Harvey	"	"	1908	389	203	83	120	..	
	Monoghan, N.	"	"	1913	384	171	60	111	..	
Port Arthur ...	Oliver	"	"	1892	.....	51	11	40	..	
	Schreiber	"	"	1908	162	63	36	27	2	
Prescott.....	W. Hawkesbury	"	"	1898	350	98	64	34	5	Car. '14 mj. 59
	Vankleek Hill	Vil.	"	1911	405	212	129	83	5	
Prince Edward.	Hallowell	Tp.	D.A.	1866	.....	.....	.....	.....	..	
	S. Marysburgh	"	L.O.	1897	531	211	77	134	2	

SCHEDULE G.—*Continued.*

Showing municipalities in which Local Option is in force 1915.—Continued.

License District.	Municipality	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Prince Edward (Continued)	Ameliasburgh	Tp.	L.O.	1906	953	295	219	76	1	
	Sophiasburgh	"	"	1906	749	253	100	153	1	
	Hillier	"	"	1909	579	320	120	200	1	
	Wellington	Vil.	"	1909	334	170	105	65	2	Car. '13, mj. 63
	*Bloomfield	" *	D.A.	.....	.....	.....	.....	.....	..	
Rainy River	Lavalee	Tp.	L.O.	1912	232	108	41	67	3	
Renfrew North.	Cobden	Vil.	"	1910	219	102	61	41	2	
	Westmeath	Tp.	"	1910	884	443	85	358	3	
	Ross	"	"	1914	365	203	24	179	0	
Renfrew, S.	McNab	"	"	1906	970	340	184	156	3	Car.'09, mj. 411
	Brougham	"	"	1909	110	47	25	22	2	
	Renfrew	Town	"	1910	851	371	232	139	8	Car. '13, mj.110
	Bagot & B	Tp.	"	1912	285	164	61	103	3	
Russell	Osgoode	"	"	1906	1,443	597	349	248	5	
S. Ste. Marie	Sault Ste. Marie	Town	"	1891	500	67	52	15	3	Shops only.
	Korah	Tp.	"	1905	750	300	200	100	..	
Simcoe, Centre.	Sunnidale	"	"	1910	750	374	168	206	1	
Simcoe, East.	Oro	"	"	1906	1,099	423	142	281	1	
	Midland	Town	"	1907	940	477	234	243	5	Car. '15, mj. 485
	Orillia	"	"	1907	1,302	585	219	316	..	Shops only.
	Medonte	Tp.	"	1908	1,089	544	273	271	6	
	Orillia	Town	"	1910	1,489	715	440	275	..	
	†Coldwater	Vil.	"	.....	.....	.....	.....	.....	..	Car.' 12, mj. 53
	Orillia	Tp.	"	1912	1,150	408	217	181	1	
	Victoria Harbor	Vil.	"	1913	330	240	85	135	1	
	Tay	Tp.	"	1914	1,023	463	229	234	1	
Simcoe, South.	Bolton	Vil.	"	1906	.....	101	90	11	2	
	Tecumseh	Tp.	"	1907	1,138	474	288	186	2	
	W. Gwillimbury	"	"	1907	786	335	145	190	..	
	Innisfil	"	"	1907	1,238	513	233	280	3	Car.'10, mj. 457
	Beeton	Vil.	"	1910	234	121	59	62	2	
	Tottenham	"	"	1910	223	111	70	41	2	
Simcoe, West.	Nottawasaga	Tp.	"	1902	1,807	635	455	170	2	Car. '09, mj. 352
	Creemore	Vil.	"	1908	228	120	57	63	2	" '11, " 45
	Collingwood	Town	"	1910	2,109	918	557	361	9	" '13, mj.
	Alliston	"	"	1910	421	213	137	76	4	agst. 99
	Stayner	"	"	1910	374	178	109	69	3	
	Essa	Tp.	"	1910	1,146	513	241	272	4	
	Tossorontio	"	"	1910	529	254	152	102	2	
Stormont	Osnabruck	"	"	1906	1,575	536	434	102	7	Car.'09,mj. 200
	Finch	Vil.	"	1910	158	72	43	29	1	" '13 and '16
	Roxborough	Tp.	"	1911	1,348	619	377	242	4	Car.'14, mj.291
Sudbury	Chapleau	"	"	1916	520	185	105	80	..	
Temiskaming	Harley	"	"	1907	182	29	13	16	..	
	Dymond	"	"	1907	175	46	20	26	..	
	Mathieson	Town	"	1916	44	23	15	8	..	
Victoria, East.	Fenelon	Tp.	"	1904	.....	231	97	134	2	Car. '14, mj.345
	Omemee	Vil.	"	1908	192	97	55	42	2	
	Somerville	Tp.	"	1908	553	226	137	89	2	
	Bobcaygeon	Vil.	"	1910	325	158	74	84	2	" '14,mj.12agst

*Part of Hallowell Township when D.A. was carried.

†Part of Medonte Township when Local Option carried.

SCHEDULE G.—*Concluded.*

Showing municipalities in which Local Option is in force 1916.—Concluded

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Victoria, West .	Mariposa.....	Tp.	L.O.	1892	1,399	397	394	73	..	Car. '98 and '02
	Eldon	"	"	1908	861	387	208	179	5	
	Woodville	Vil.	"	1908	147	75	38	37	1	
Waterloo, S....	N. Dumfries	Tp.	"	1907	725	312	160	152	2	
	Galt	Town	"	1910	2,718	1,337	878	459	9	Car. '13, mj.
Welland.....	Thorold.....	Tp.	"	1913	682	288	180	108	..	agst. 44
Wellington, E..	W. Garafraxa.....	"	"	1905	850	302	235	67	2	Carried in '93,
	Erin	"	"	1908	1,120	499	292	207	4	'98 and 1905.
	Luther, W.....	"	"	1910	637	250	127	123	1	
	Nichol	"	"	1913	540	219	127	92	1	
Wellington, S..	Eramosa.....	"	"	1910	793	378	209	169	3	
	Puslinch	"	"	1914	873	423	200	223	2	
Wellington, W.	Maryborough	"	"	1905	848	453	255	198	3	
	Peel..	"	"	1906	1,100	438	314	124	4	Car. '09 and '12
Wentworth, N.	Beverly.....	"	"	1908	1,265	611	288	323	2	" '11,mj.436
	Flamboro, E	"	"	1911	890	352	216	136	2	
	Flamboro, W.....	"	"	1914	770	395	223	172	2	
Wentworth, S..	Binbrook.....	Tp.	"	1899	408	185	87	98	1	
	Ancaster.....	"	"	1908	1,235	579	388	221	4	
	Glanford.....	"	"	1910	527	263	136	127	2	
York, East....	Markham	"	"	1906	1,525	624	430	194	5	Car. '09, mj. 139 '13, mj. 448
York, North...	Richmond Hill	Vil.	"	1906	213	99	78	21	..	" '09, " 191
	Whitchurch	Tp.	"	1905	1,225	366	191	175	1	" " " 321
	Stouffville	Vil.	"	1906	475	221	122	99	2	" " " 80
	Gwillimbury, E.....	Tp.	"	1910	1,227	658	266	392	2	
	Newmarket.....	Town	"	1910	932	492	253	239	4	" '15 " 256
	King.....	Tp.	"	1913	1,703	795	403	392	5	
	Gwillimbury, N.....	"	"	1911	722	371	144	227	2	
	Holland Landing	Vil.	"	1915	106	63	39	24	1	
	Aurora	Town	"	1916	737	426	234	192	3	
York, West	Toronto Junction	Town	"	1904	2,600	869	679	190	7	Car.'07, mj. 337
	Weston.....	Vil.	"	1907	469	227	148	79	3	
	Vaughan	Tp.	"	1906	.....	459	373	86	7	" '09, " 170
	North Toronto.....	Town	"	1905	.....	268	243	25	3	" '08, " 111

UNDER CANADA TEMPERANCE ACT:

Manitoulin Island.....1914
Huron County.....1915
Peel County.....1915

Beginning May 1st, 1915, the following municipalities, formerly under Local Option, are now under the "Canada Temperance Act" as parts of the Counties of Huron and Peel:—Ashfield, Clinton, Colborne, Grey, Howick, Hullett, Morris, Stanley, Tuckersmith, Turnberry, Usborne, and Wawonish in Huron County; and Albion, Bolton, Brampton, Caledon and Chinguacousy in Peel County; and Carnarvon and Tehkummah in Manitoulin.

SCHEDULE H.

STATEMENT showing number of convictions and dismissals of cases, for infraction of the Liquor License Act, against licensees and others, during the license year 1915-16.

(This statement does not include Local Option cases, which appear in Schedule I.)

License District.	Against Licensees.		Against Non-licensees.	
	No. of Convictions.	No. of Dismissals.	No. of Convictions.	No. of Dismissals.
Addington	1	.....	4	.....
Algoma	2	2	1	2
Brant, North	4	.....	10	1
Brant, South	.....	.....	16	2
Bruce, North	4	3	3	.....
Bruce, South	6	.....	1	.....
Dundas	.....	3	2	1
Elgin, East	.....	.....	3	.....
Elgin, West	.....	.....	25	1
Essex, North	4	2	4	.....
Essex, South	2	.....	9	1
Fort William	.....	.....	3	.....
Grenville	1	.....	.....	3
Grey, Centre	4	1	7	1
Grey, North	.....	.....	.....	1
Grey, South	1	.....	.....	.....
Haldimand	2	2	.....	1
Halton	2	1	.....	4
Hamilton	.....	.....	6	13
Hastings, East	4	.....	2	.....
Hastings, North	.....	.....	3	.....
Hastings, West	2	.....	9	2
Huron, North	.....	.....	65	18
Huron, South	.....	.....	52	7
Kenora	5	2	8	3
Kent, East	.....	2	8	.....
Kent, West	6	8	3	5
Kingston	4	2	5	2
Lambton, East	2	.....	.....	.....
Lambton, West	3	.....	.....	.....
Lanark, North	9	1	10	1
Lanark, South	2	1	17	10
Leeds	1	3	7	4
Lennox	1	.....	9	2
Lincoln	.....	.....	4	.....
London	1	.....	5	4
Manitoulin	.....	.....	22	7
Middlesex, East	1	.....	.....	.....
Middlesex, North	2	1	2	.....
Monck	.....	.....	9	.....
Muskoka	6	.....	7	2
Nipissing	1	.....	.....	.....
Norfolk, North	1	1	5	.....
Norfolk, South	2	.....	2	.....
Northumberland, East	1	.....	1	.....
Northumberland, West	1	.....	.....	.....
Ontario, North (1)	.....	.....	8	3
Ontario, South	3	2	11	4
Ottawa	6	3	1	.....
Oxford, North	1	.....	.....	.....
Oxford, South	.....	.....	2	.....

SCHEDULE H.—*Concluded.*

Statement showing number of cases prosecuted, etc.—*Concluded.*

License District.	Against Licensees.		Against Non-licensees.	
	No. of Convictions.	No. of Dismissals.	No. of Convictions.	No. of Dismissals.
Parry Sound, East	4	5	4	2
Parry Sound, West	1	.....	21	1
Peel	.....	.....	13	4
Perth, North	2	4	3	2
Perth, South	7	1	1	.....
Peterborough, East	1	1	.....	.....
Peterborough, West	.....	2	3	1
Port Arthur	5	.....	22	.....
Prescott	12	6	10	1
Prince Edward	6	4	11	2
Rainy River	.....	1	3	.....
Renfrew, North	3	1	10	.....
Renfrew, South	5	2	16	.....
Russell	6	1	3	6
St. Catharines	.....	.....	5	5
Sault Ste. Marie	5	2	34	1
Simcoe, Centre	2	.....	12	1
Simcoe, East	2	1	.....	2
Simcoe, South	.....	.....	2	.....
Stormont	1	1	3	.....
Sturgeon Falls	2	.....	3	.....
Sudbury	2	1	15	3
Temiskaming	3	2	132	30
Toronto	6	1	.....	1
Victoria, East	2	.....	1	.....
Victoria, West	1	1	14	1
Waterloo, South	3	1	.....	.....
Welland	3	1	29	4
Wellington, East	2	3	3	2
Wellington, South	.....	.....	4	1
Wellington, West	2	.....	6	.....
Windsor	7	5	5	1
York, East	.....	.....	.....	2
York, North	1	.....	.....	.....
York, West	.....	1	.....	.....
Totals	204	88	806	178

Included in the foregoing cases are the cases hereinafter set forth of prosecutions against inebriates who have been prohibited under the statute from getting or being supplied with liquor; also cases against licensees for delivering liquor to such inebriates; also cases against unlicensed persons for supplying such inebriates.

	Convictions.	Dismissals.
Inebriates	295	17
Licensees	23	15
Unlicensed persons	51	23
	369	55

SCHEDULE I.

Statement showing number of convictions and dismissals of cases for violation of Local Option By-laws during the license year, 1915-16.

Municipality.	License District.	No. of Convictions.	No. of Dismissals.
Camden, East	Addington	6	
Kennebec	"	2	
Burford	Brant, North	1	3
S. Dumfries	"	1	
Athens	Brockville	7	
Huron	Bruce, Centre	4	1
Albemarle	Bruce, North	1	
Bruce	"	2	
Saugeen	"	1	1
Southampton	"	9	
Tara	"	1	1
Tiverton	"		1
Teeswater	Bruce South	1	
North Gower	Carleton	2	
Amaranth	Dufferin	6	
Grand Valley	"	4	3
Melancthon	"	4	2
Mono	"	3	1
Mulmur	"	1	
Orangeville	"	2	3
Shelburne	"	3	6
Iroquois	Dundas	6	
Matilda	"	3	
Clarke	Durham, West	1	
Southwold	Elgin, West	2	
Colchester, N	Essex, South	1	
Colchester, S	"	3	
Leamington	"	5	
West Tilbury	"	3	
Portland	"	2	1
Loughborough	"	6	
Storrington	"	1	
Alexandria	Glengarry	12	15
Charlottenburg	"	5	5
Kenyon	"	5	2
Lancaster	"	5	1
Lochiel	"	7	3
Maxville	"	1	
Kemptville	Grenville	4	
Shallow Lake	Grey, North	1	
Derby	"	1	
Owen Sound	"	64	75
Meaford	"	14	8
Sydenham	"	4	3
Proton	Grey, South	2	
Dereham	"		2
Egremont	"	3	1
Jarvis	Haldimand		1
Walpole	"	2	
Glamorgan	Haliburton	1	
Thurlow	Hastings, East	3	
Tweed	" "	2	1
Sidney	Hastings, West	4	
Clinton	Huron, Centre	4	1
Ashfield	Huron, North	1	
Howick	"	1	
Turnberry	"	2	
Blenheim	Kent, East		2
Camden	"	2	
Oxford	"	2	
Raleigh	Kent, West	6	
Tilbury, East	"	2	

SCHEDULE I.—*Continued.*

Statement showing number of cases prosecuted, etc.—*Continued.*

Municipality.	License District.	No. of Convictions	No. of Dismissals.
Arkona	Lambton, East	1	
Brooke	" "	3	
Forest	" "		1
Wyoming	" "	3	1
Moore	Lambton, West.	2	
Almonte	Lanark, North	5	1
Leeds & Lansdowne, Rear	Leeds	7	
" Front	"	1	
Bastard and Burgess	"	17	10
Newboro	"	2	4
Newburgh	Lennox	1	
Richmond	"	3	1
West Nissouri	Middlesex, East	8	
Adelaide	" North	1	
Strathroy	" "	1	
Waterford	Norfolk, North		1
Port Rowan	" South		2
Brighton	Northumberland, East	1	
Colborne	" "	2	1
Cramahe	" "	1	
Murray	" "	1	
Beaverton	Ontario, North	1	
Pickering	Ontario, South	1	
Blenheim	Oxford, North	1	
East Oxford	Oxford, South	1	
Asphodel	Peterborough, East	2	
Havelock	" "	2	3
Norwood	" "	1	
Smith	" West	3	
Vankleek Hill	Prescott	1	
Ameliasburgh	Prince Edward	1	
South Marysburgh	"	2	1
Wellington	"	2	
Bagot	Renfrew, South	4	
Brougham	" "	3	
McNab	" "	1	2
Renfrew	" "	10	5
Coldwater	Simcoe, East		1
Victoria Harbor	" "	1	
Midland	" "	3	
Orillia, Tn	" "	3	
Orillia, Tp	" "	1	
Tay	" "	23	5
Innisfil	" South	1	
Tecumseth	" "	3	
Alliston	" West	3	
Collingwood	" "		2
Creemore	" "	1	3
Tossoronto	" "	1	
Finch	Stormont	1	2
Osnabruck	"	4	
Bobcaygeon	Victoria, East	7	
Omemee	" "	4	
Somerville	" "	3	
Eldon	" West	12	
Mariposa	" "	1	
Eramosa	" South		2
Maryborough	" West	5	
Beverly	Wentworth, North		1
King, North Gwillimbury	York, North	2	
Totals		426	192

SCHEDULE K.

Showing fines imposed and collected in Municipalities under Local Option during the license years, 1914-15 and 1915-16.

Municipality.	License District.	1914-15		1915-16	
		Fines imposed.	Fines collected.	Fines imposed.	Fines collected.
		$	$	$	$
Camden, East	Addington	250	230	140	140
Hinchinbrooke	"	20	20	.....	.....
Kennebec	"	20	20	40	40
Newburgh	"	20	20	.....	.....
Bruce Mines	Algoma	20	20	.....	.....
MacDonald, Meredith & Aberdeen	"	60	60	.....	.....
Burford	Brant, North	40	40	20	20
South Dumfries	" "	.....	.....	20	20
Yonge and Escott, Rear	Brockville	20	20	.....	.....
Huron	Bruce, Centre	.....	.....	885	885
Albemarle	" North	.....	.....	20	20
Bruce	" "	.....	.....	40	40
Sangeen	" "	.....	.....	20	20
Southampton	" "	.....	.....	180	60
Tara	" "	.....	.....	20	20
Lucknow	" South	20	20	.....	.....
Teeswater	" "	.....	.....	50	.....
North Gower	Carleton	.....	.....	40	40
Amaranth	Dufferin	.....	.....	180	140
East Garafraxa	"	140	140	.....	.....
Grand Valley	"	60	20	100	100
Melancthon	"	20	20	900	900
Mono	"	100	100	60	60
Mulmer	"	40	40	40	40
Orangeville	"	20	20	600	300
Shelburne	"	240	240	20	20
Iroquois	Dundas	40	40	100	80
Matilda	"	80	80	60	60
Mountain	"	65	40	.....	.....
Clarke	Durham, West	40	.....	20	20
Southwold	Elgin, West	.....	.....	50	30
North Colchester	Essex, South	20	.....	20	40
South Colchester	" "	20	20	340	40
Kingsville	" "	270	145	.....	125
Leamington	" "	320	320	40	40
West Tilbury	" "	100	100	60	40
Loughboro'	Frontenac	280	280	.....	.....
Kingston	"	20	20	.....	.....
Portland	"	120	120	.....	.....
Storrington	"	40	40	.....	.....
Alexandria	Glengarry	240	40	132	160
Charlottenburg	"	60	60	120	100
Kenyon	"	240	120	105	145
Lancaster	"	.....	.....	340	40
Lochiel	"	400	400	440	417
Maxville	"	.....	.....	20	20
Kemptville	Grenville	200	140	140	140
Oxford	"	20	20	.....	.....
Artemesia	Grey, Centre	460	360	.....	.....
Collingwood, Tp	" "	100	20	.....	.....
Osprey	" "	200	100	.....	.....
Holland	" "	25	25	.....	.....
Derby	" North	20	20	20	20
Meaford	" "	440	420	220	160
Owen Sound	" "	2,990	1,420	5,825	1,415
Shallow Lake	" "	.....	.....	300	300
Sydenham	" "	100	100	60	60

SCHEDULE K.—*Continued.*

Showing fines imposed and collected in Municipalities under Local Option during the license years 1914–15 and 1915–16.

Municipality.	License District.	1914–15		1915–16	
		Fines imposed.	Fines collected.	Fines imposed.	Fines collected.
		$	$	$	$
Durham	Grey, South	20	20	.....	.....
Egremont	" "	40	40	60	60
Proton	" "	120	100	40	40
Walpole	Haldimand	.....	.....	30	30
Glamorgan	Haliburton	.....	.....	20	20
Thurlow	Hastings, East	1,200	300	300	.....
Tweed	" "	20	20	40	40
Stirling	" North	400	400	.....	.....
Wollaston	" "	80	78	.....	.....
Sidney	" West	.....	.....	700	700
Clinton	Huron, Centre	140	140	.....	.....
Ashfield	" North	40	40	.....	.....
Howick	" "	100	100	.....	.....
Turnberry	" "	40	40	.....	.....
Blenheim	Kent, East	20	20	.....	.....
Camden	" "	.....	.....	40	20
Oxford	" "	.....	.....	40	40
Raleigh	" West	140	100	120	120
Tilbury East	" "	.....	.....	40	40
Arkona	Lambton, East	40	40	20	20
Brooke	" "	140	80	80	80
Forest	" "	440	220	.....	.....
Wyoming	" "	290	310	60	60
Moore	" West	100	.....	.....	.....
Almonte	Lanark, North	20	20	100	100
Bastard and Burgess	Leeds	445	265	360	290
Leeds and Lansdowne, Front	"	80	20	20	40
Leeds & Lansdowne, Rear	"	120	120	180	180
Newboro'	"	.....	.....	60	40
Richmond	Lennox	.....	.....	60	60
Newburgh	"	.....	.....	20	20
Niagara	Lincoln	200	200	.....	.....
West Nissouri	Middlesex, East	.....	.....	160	160
Adelaide	" North	100	100	20	20
Ailsa Craig	" "	60	60	.....	.....
Strathroy	" "	20	20	40	40
Gainsboro'	Monck	200	200	.....	.....
Morrison	Muskoka	60	60	.....	.....
Windham	Norfolk, North	.....	20	.....	.....
North Walsingham	" South	100	100	.....	.....
Brighton	Northumberland, East	170	107	20	10
Colborne	" "	40	40	320	120
Cramahe	" "	20	20	20	20
Murray	" "	.....	.....	300	.....
Percy	" "	140	140	.....	.....
Haldimand	" West	20	20	.....	.....
Scott	Ontario, North	100	100	.....	.....
Brock	" "	40	40	.....	.....
Uxbridge	" "	200	200	.....	.....
Beaverton	" "	.....	.....	300	300
Pickering	" South	.....	.....	20	20
Whitby, East	" "	200	150	.....	.....

SCHEDULE K. —*Continued.*

Showing fines imposed and collected in Municipalities under Local Option during the license years 1914-15 and 1915-16.

Municipality.	License District.	1914-15.		1915-16.	
		Fines imposed.	Fines collected.	Fines imposed.	Fines collected.
		$	$	$	$
Blenheim	Oxford, North	.....	.....	300	.....
Embro	" "	20	20	.....	.....
Ingersoll	" South	600	.....	.....	.....
South Norwich	" "	20	20	.....	.....
East Oxford	" "	.....	.....	300	300
Caledon	Peel	110	110	.....	.....
Elma	Perth, North	40	40	.....	.....
Asphodel	Peterborough, East	20	20	40	40
Havelock	"	360	250	20	40
Norwood	"	120	45	20	.....
Smith	" West	.....	.....	340	320
Vankleek Hill	Prescott	20	20	20	20
Ameliasburgh	Prince Edward	.....	.....	300	300
South Marysburgh	"	.....	.....	40	40
Wellington	"	20	.....	40	40
Bagot	Renfrew, South	105	65	100	80
Brougham	"	20	.....	60	60
McNab	"	40	40	20	20
Renfrew, Tn	"	160	140	240	220
Coldwater	Simcoe, East	400	400	.....	.....
Midland	"	100	100	900	300
Orillia, Tn	"	530	175	600	.....
Orillia, Tp	"	300	.....	300	300
Tay	"	625	595	4,040	400
West Gwillimbury	Simcoe, South	40	40	.....	.....
Beeton	"	100	100	.....	.....
Innisfil	"	20	20	60	60
Tecumseh	"	520	520	20	20
Alliston	Simcoe, West	340	340	50	50
Creemore	"	150	150	350	350
Essa	"	250	250	.....	.....
Stayner	"	100	100	.....	.....
Tossorontio	"	.....	.....	20	20
Finch	Stormont	.....	.....	300	300
Osnabruck	"	100	20	90	90
Bobcaygeon	Victoria, East	220	220	160	120
Omemee	"	40	40	320	40
Somerville	"	540	540	20	20
Eldon	Victoria, West	120	120	.....	.....
Mariposa	"	.....	.....	20	20
Woodville	"	60	60	.....	.....
Erin	Wellington, East	20	20	.....	.....
Nichol	"	40	40	.....	.....
Eramosa	Wellington, South	80	80	.....	.....
Puslinch	"	40	40	.....	.....
Maryborough	" West	20	.....	120	120
Beverly	Wentworth, North	150	150	.....	.....
East Flamborough	"	100	100	.....	.....
West "	"	20	20	.....	.....
North Gwillimbury	York, North	.....	.....	600	600
King	"	100	100	.....	.....
Totals	Totals	20,485	14,620	25,187	13,277

SCHEDULE L.

License Inspectors under Ontario Temperance Act and Canada Temperance Act.

License District.	Inspector.	P. O. Address.
Algoma	Jas. Grigg	Bruce Mines.
Brant	R. J. Eacrett	Brantford.
Bruce	J. M. White	Walkerton.
Carleton	Howard Graham	Carp.
Chatham (and part of Kent)	T. M. French	Chatham.
Dufferin (and part of Simcoe)	T. J. Robinson	Orangeville.
Dundas	E. P. Foster	Morrisburgh.
Elgin (including St. Thomas)	Walter Ross	St. Thomas.
Essex	J. E. Stone	Essex.
Frontenac (including Kingston)	W. McCammon	Kingston.
Grenville	A. Carson	Prescott.
Grey	M. C. Beckett	Owen Sound.
Guelph (and part of Wellington)	Jas. O'Brien	Guelph.
Halton	Jno. Harvey	Acton.
Hamilton	Jas. Sturdy	Hamilton.
Hastings	Jno. Stokes	Tweed.
Huron N. (C.T.A)	J. J. Mitchell	Wingham.
Huron S. (C.T.A.)	Jno. Torrance	Clinton.
Kent	B. W. Wilson	Ridgetown.
Kenora	T. Dougherty	Kenora.
Lambton E.	P. D. McCallum	Forest.
Lambton (including Sarnia)	Geo. Lucas	Sarnia.
Lanark	J. J. McGregor	Carleton Place.
Leeds	F. B. Taber A. G. Sykes (Prov. Off.)	Brockville.
Lennox and Addington	W. S. Exley J. McL. Wheeler (Prov. off.)	Napanee. Tamworth.
Lincoln	J. W. King	St. Catharines.
Manitoulin (C.T.A.)	Wm. Vincer	Mindemoya.
Middlesex (including London)	J. E. Keenleyside Thos. Magladery (Prov. off.)	London. Parkhill.
Nipissing	L. S. Didier	North Bay.
Niagara Falls (and pt. Welland)	Geo. F. House	Stevensville.
Norfolk and Haldimand	R. Edmonds	Simcoe.
Northumberland and Durham	Geo. Gooderich	Cobourg.
Ontario	L. R. Luke	Oshawa.
Ottawa	J. C. Enright	Ottawa.
Oxford (including Woodstock)	W. Shaver	Woodstock.
Parry Sound	W. J. White	Novar.
Peel (C.T.A.)	J. D. Orr	Meadowvale.
Perth (C.T.A.)	F. E. Elliott	Listowel.
Peterborough	Jos. Stewart	Peterborough.
Port Arthur and Fort William	A. R. Elliott	Port Arthur.
Prescott	Jos. Lemieux	L'Orignal.
Prince Edward (including part of Hastings and Belleville)	R. C. Arnott	Belleville.

SCHEDULE L.—*Continued.*

License District.	Inspector.	P. O. Address.
Rainy River	Geo. Campbell	Fort Frances.
Renfrew	Jno. Connolly	Renfrew.
Russell	W. J. Campbell	Metcalfe.
Sault Ste. Marie	W. R. Cunningham	Sault Ste. Marie.
Simcoe and Muskoka	W. Fisher	Orillia.
Stormont and Glengarry	A. McDonald	Alexandria.
Sudbury	T. N. Kilpatrick	Sudbury.
Temiskaming	W. S. Blackwell	Haileybury.
Toronto	R. S. Burrows P. J. Jennings Richard Greer	Toronto.
Victoria and Haliburton	Wm. Thornbury	Lindsay.
Waterloo	J. Winterhault	Kitchener.
Welland	Geo. A. Akins	Thorold.
Wellington	Jno. Gordon	Drayton.
Wentworth	R. T. Gould	Bartonville.
Windsor	M. N. Mousseau	Windsor.
York	D. Mackenzie	Woodbridge.

STATEMENT OF LICENSE REVENUE FOR FINANCIAL YEARS.

Statement showing Revenue from License Branch received by the Province of Ontario for the financial years ending October 31st, 1914, 1915 and 1916.

——	1914	1915	1916
Received from—	$ c.	$ c.	$ c.
Brewers' Warehouse Licenses	8,600 00	8,500 00	535 00
Brewers' Licenses	32,350 00	31,725 00	1,163 34
Distillers' Licenses	44,666 67	44,666 67	45 00
Wholesale Licenses	15,041 67	14,541 67	5,930 00
Tavern and Shop Licenses, Transfers and Fines	453,795 96	476,300 16	235,926 95
Sample and Commission Licenses	3,225 00	3,225 00	40 00
Seized Liquor	920 33	1,202 34	1,131 44
Five per cent. commission on Bar Sales.	299,200 51	219,346 83	101,376 92
Refund for Collection of Revenue and Premium on Fidelity Bonds	2,410 00	2,295 93	20 00
	860,210 14	801,803 60	346,168 65

BOARD OF LICENSE COMMISSIONERS FOR ONTARIO.

Statement of Salaries and Travelling Expenses for Six months ending 16th September, 1916.

J. D. Flavelle, Chairman—		
Salary from 31st October, 1915, to Sept. 30th, 1916, at $6,500 per annum	$5,959 66	
Travelling expenses	682 95	
		$6,642 61
W. S. Dingman, Vice-Chairman—		
Salary from 31st October, 1915, to Sept. 30th, 1916, at $6,000 per annum	5,500 00	
Travelling Expenses	431 29	
		5,931 29
J. A. Ayearst, Commissioner—		
Salary from 31st October, 1915, to Sept. 30th, 1916, at $4,000 per annum	3,667 33	
Travelling expenses	640 25	
		4,307 58
Geo. T. Smith, Commissioner—		
Salary from 31st October, 1915, to Sept. 30th, 1916, at $4,000 per annum	3,667 33	
Travelling expenses	916 12	
		4,583 45
Frederick Dane, Commissioner—		
Salary from 31st October, 1915, to Aug. 12th, 1916, at $4,000 per annum	3,132 20	
Travelling expenses	131 50	
		3,263 70
Clarke E. Locke, Secretary—		
Salary from 31st October, 1915, to Oct. 31st, 1916, at $1,800 per annum		1,800 00
E. Saunders, Solicitor—		
Salary from 31st October 1915, to Oct. 31st, 1916, at $800 per annum		800 00
J. H. Strachan, Stenographer—		
Salary from December 11th, 1915, to Oct. 31st, 1916		671 00
Automobile Livery Co., Toronto		100 00
Total		$28,099 63

RECEIPTS AND EXPENDITURES FOR THE LICENSE DISTRICTS FROM MAY 1ST, 1916 TO SEPTEMBER 16TH, 1916, UNDER THE LIQUOR LICENSE ACT.

Received for Extensions of Tavern and Shop Licenses (1,381)	$6,905 00
" Bartenders' Licenses	46 00
" Transfers	145 01
" from fines	12,666 95
Transferred from L. O. fines	1,935 59
Balances transferred from 1915-16 accounts	4,195 73
Grants from Ontario Treasury	24,718 34
	$50,612 62

By Expenses for Salaries, Legal Expenses, etc., as follows:

Addington	$332 24
Algoma	501 34
Brant, North	298 22
" South	556 38
Brockville	354 54
Bruce, Centre	231 48
" North	259 90
" South	293 60
Carleton	256 46
Dundas	195 37
Durham	378 57
Elgin, East	314 91
" West	409 47
Essex, North	585 95
" South	355 31
Fort William	608 97
Frontenac	190 40
Grenville	197 20
Grey, Centre	275 01
" South	336 53
Haldimand	329 75
Halton	272 12
Hamilton	1,462 21
Hastings, East	467 90
" North	130 01
" West	546 94
Kent, East	315 62
" West	647 95
Kenora	584 35
Kingston	658 89
Lambton, East	420 22
" West	398 69
Lanark, North	300 61
" South	464 04
Leeds	392 96
Lennox	337 87
Lincoln	372 56
London	888 03
Manitoulin	57 07
Middlesex, West	16 08
Monck	245 38
Muskoka	348 86
Nipissing	543 35
Norfolk, North	147 94
" South	205 25
Northumberland, East	185 41
" West	389 64
Ontario, South	323 90
Ottawa	1,221 52
Oxford, North	362 08
" South	269 59
Parry Sound, East	319 55
" West	372 42
Perth, North	77 00
Peterborough, West	449 04
Port Arthur	750 63
Prescott	517 85
Prince Edward	248 48
Rainy River	504 85
Renfrew, North	454 24
" South	303 40
Russell	378 18
Sault Ste. Marie	468 17
St. Catharines	684 11
Simcoe, Centre	291 91
" East	375 54
" South	207 07
Stormont	550 96
Sturgeon Falls	234 02
Sudbury	794 14
Temiskaming	852 25
Toronto	3,261 41
Victoria and Haliburton	532 77
Waterloo, North	508 43
" South	361 20
Welland	667 66
Wellington, East	346 42
" South	430 60
" West	473 40
Wentworth, North	280 01
" South	220 85
Windsor	819 81
York, East	415 36
" North	257 30
" West	297 50
Amount paid to Provincial Treasurer for fines	12,666 95
Total	$50,612 62

REPORT

OF THE

Minister of Agriculture

PROVINCE OF ONTARIO

FOR THE YEAR ENDING
OCTOBER 31, 1916

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1917

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REPORT

OF THE

Minister of Agriculture

1916

To His Honour Sir John Strathearn Hendrie, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc. etc.,

Lieutenant-Governor of the Province of Ontario

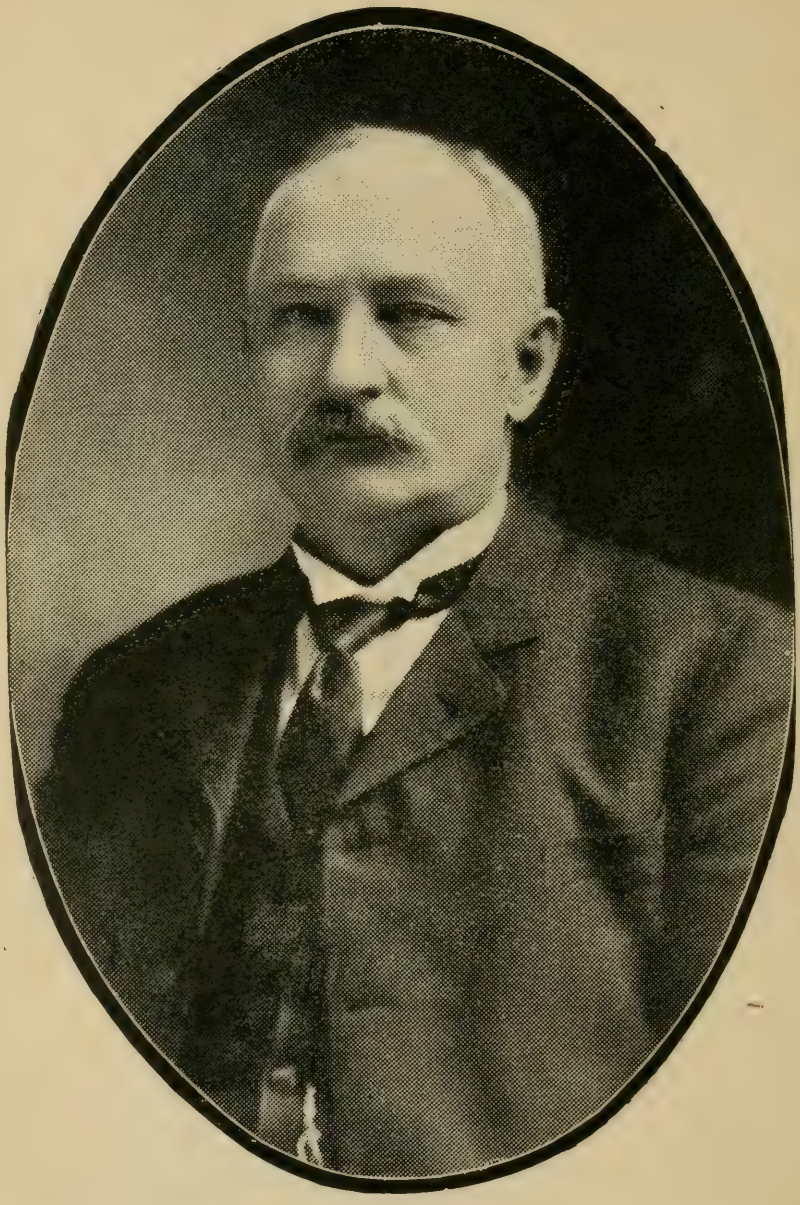
May it Please Your Honour:

I have the honour to submit the annual report of the Department of Agriculture for the fiscal year ending October 31, 1916.

During that time the Department was administered by my late colleague, the Honourable James S. Duff, who died on November 17. In spite of failing health, the late Minister, with characteristic devotion to duty, supervised the work throughout the entire year. For a time he was compelled to be absent from the office, but he was nevertheless in close touch with his officers. This report was naturally not prepared in time to be submitted for his approval as his death occurred so soon after the close of the fiscal year. At the same time the year's work stands to his credit and closed a career of great usefulness to his native Province.

Respectfully submitted,

W. H. HEARST,
Minister of Agriculture.



THE LATE HON. J. S DUFF.

Report of the Minister of Agriculture

1916

In submitting a brief review of the work of the Department for the past year it may be in order to note first that the Province, agriculturally speaking, has passed through one of the most remarkable seasons in her history.

The first part of the season was marked by abnormal rainfall. This was so continuous that it was only with difficulty that seeding was done, and in many sections considerable areas were left barren. Then followed excessive hot and dry weather of July and August, baking the ground and retarding growth. The effect on the crops can readily be seen. Benefiting by the early rains, the hay crop was the greatest on record. Suffering from late and imperfect seeding caused by early rains and from drought and heat, the grain and root crops were among the poorest on record. The high prices prevailing, however, brought the financial returns on the whole well up to the average. The dairy industry, in spite of the falling off at the last of the season, experienced the best year in its history in point of returns.

The work of the Department is, of course, only partially influenced by climatic conditions. Wherever possible information and other assistance is extended to enable farmers to meet climatic or labor conditions which develop, but in the main the work is carried on to meet all conditions. The work is reviewed under the different branches of the organization. Included is a brief statement of the work of the factory inspection and stationary engineers' branches. This is probably the last time these will be a part of this report. With the end of this year they were transferred to the Public Works Department to form a part of the important labor branch being organized under this Department. With this transfer this Department is now probably the only exclusively agricultural department in the Dominion.

Acknowledgment should again be made of the grant received under the Federal Agricultural Instruction Act. This money, augmenting the regular appropriations, has made possible the further spreading of the gospel of better farming and has particularly aided in securing increased production at this time. The Agreement for the current year contained the following provisions:

1. District Representative work, including clerical or other assistance in connection with the administration		$120,000 00
2. Agricultural College:		
(*a*) Capital expenditure	$55,000 00	
(*b*) Salaries and expenses of additions to staff and maintenance	14,000 00	
		69,000 00
3. O. A. C. Short Courses, travelling and living expenses of winners of Acre Profit and Live Stock Competitions		1,800 00
4. To encourage agriculture, manual training, as applied to work on the farm, and domestic science in High, Public, Separate and Continuation Schools, and in Universities, to be available for grants and for travelling and living expenses of teachers and others in attendance at Short Courses or other educational gatherings, in addition to services, expenses and equipment, and to be paid out on the recommendation of the Department of Education		26,000 00
5. Educational work in connection with marketing of farm products, including organization of co-operative societies, collection, printing and distribution of information on current prices and systems of marketing		5,000 00

6. Stock and Seed Judging, Short Courses and Institute Lecture Work ..		2,000 00
7. Drainage work		10,000 00
8. Demonstrations and instruction in vegetable growing		4,000 00
9. Demonstration work on soils		4,200 00
10. Work in Beekeeping		1,500 00
11. Dairy Demonstrations		1,658 45
12. Fruit Work:		
(*a*) Experimental work at Vineland Horticultural Experiment Station	$2,500 00	
(*b*) Demonstrations with vegetables and hardy fruits in New Ontario	3,500 00	
		6,000 00
13. Agricultural School, including purchase of land, construction of buildings, purchase of equipment, and other services or expenses pertaining thereto, including operation and maintenance of same		50,000 00
		$301,158 45

In pursuance of one of the items of this Agreement an important new policy was announced by the Government during the summer. This was the establishment of a new Agricultural School, and may best be explained by placing on record the announcement as made by the late Minister of Agriculture himself as follows:

Splendid field of wheat in Huron—scenes like this mean strength to the Empire.

"A new agricultural school is to be established through the Ontario Department of Agriculture for the purpose of serving a large proportion of Eastern Ontario. It is to be located on land which has been secured adjacent to the town of Kemptville. Plans for the buildings and for organizing the work are being undertaken at once.

"The proposed school is the only natural evolution of the progressive agricultural policy of the Government. It will be recalled that the late Sir James Whitney, while in opposition advocated local agricultural schools. Out of this arose the system of District Representatives which was inaugurated shortly after the Government came into office. This system at its inception was intended to be more for the teaching of agriculture to boys in schools than for the outside work. The early experience of those in charge of the system, however, demonstrated that owing to the fact that little ground work had been done in agricultural instruction among the young men before, there was little or no demand for agricultural instruction among the young men. As a conse-

quence the District Representatives found their greatest usefulness in the field, and in the carrying on of their work they have also done a great deal through school fairs, four to six weeks' winter courses, Junior Farmers' Improvement Associations and by other means to emphasize the advantages to be gained by young men through greater agricultural education and thereby creating a demand for more along this line. Consequently we feel that the time has arrived when an agricultural school in the Province will be successful and will render a real service.

"The purpose of the school, therefore, is to make more available practical education in agriculture and domestic science at a point which will be readily accessible and involve a minimum of expense to the students. It is not proposed to duplicate anything already being done in the Province unless it is to some extent the first two years of the course at the Ontario Agricultural College. Our experience in District Representative work has shown that there is a large number of young men between the ages of sixteen and twenty-five who have left school and yet who would like to take advantage of further education in their chosen vocation if it can be secured reasonably conveniently. There has also been indicated a demand for education in domestic science among the young women in the rural districts, and it is the intention of this enterprise to meet this demand as far as it is possible.

"Although the details of the courses will be determined later in conference with the Ontario Agricultural College officials, I may say that it is our intention to make the courses as useful and practical as possible. In agriculture there will be no course longer than two years, and there will also doubtless be a number of short courses. It is possible that the term will extend for only about five or six months in the winter season and a diploma granted at the end of two terms. While arrangements might be made to have this diploma entitle a student to admission at the Ontario Agricultural College if he desired to enter the College at the third year, it would, nevertheless, be the main purpose of the school to further qualify men and women for better work on their own farms and homes. The land in connection with the school, except that which may be needed for experimental purposes, will be used as a practical farming proposition, putting in use the best methods available. No doubt in this institution dairying will be the line adopted so as to render the maximum service to the community, which is so largely engaged in this industry. The course in domestic science would no doubt, at the outset at least be mainly short courses of perhaps three months duration.

"In selecting the site considerable care has been exercised. It was, of course, obvious at the outset that an institution of this kind should be located in Eastern Ontario. Different localities were considered but the present selection was finally adopted on the recommendation of officers of the Department who investigated the matter. Kemptville, which is a progressive town in the heart of a very thrifty agricultural section, is admirably served by railways from the north, south, east and west, and thereby immediately serves the counties of Dundas, Carleton, Lanark and Grenville; but it is also splendidly convenient to the majority of counties of Eastern Ontario. The farm practically adjoins the town. It is within view of the C.P.R. Ottawa line and also fronts on the proposed Ottawa-Prescott highway. While there are splendid transportation facilities, it is also true that the whole surroundings and atmosphere are rural in nature, and therefore afford the proper setting for an institution of this kind.

"Plans are under way for the necessary buildings and equipment. There will be one main building of considerable size which will afford class rooms and laboratories. There will also doubtless be other smaller buildings for live stock and seed work as well as the usual farm buildings. It is not proposed to erect dormitories, as excellent board and lodging can be secured in the town at reasonable rates. Just how rapidly the work of construction can be pushed forward may depend somewhat on the progress of the war, but in any event it is expected that this institution will be ready to take an important place in the after-war development policy of the Government."

ONTARIO AGRICULTURAL COLLEGE.

Except in point of attendance, which has necessarily suffered on account of the war, this Branch of the Department's activities has had one of the most successful and useful years in its history. The following figures tell their own story:

General Course		395	
Specialists in General Course Work		11	
Manual Training (One Year Normal Course)		9	
Dairy Course		82	
Stock and Seed Judging		201	
Poultry Raising		23	
Fruit Growing		43	
Apiculture		55	
			819
Domestic Science (at Macdonald Institute)		312	
Summer Courses:			
High School—1st Year, 18; 2nd, 16	34		
Public School—1st Year, 112; 2nd, 41	153		
School for Rural Leadership	24		
		211	
			523
Total			1,342

ANALYSIS OF COLLEGE ROLL (GENERAL COURSE), 1915.

From Ontario.

Algoma	2	Huron	5	Peterborough	7
Brant	4	Kent	5	Prescott	3
Bruce	7	Lambton	8	Prince Edward	3
Carleton	18	Lanark	3	Renfrew	4
Dufferin	2	Lennox	4	Russell	5
Dundas	3	Lincoln	9	Simcoe	11
Durham	7	Middlesex	17	Stormont	2
Elgin	8	Muskoka	3	Thunder Bay	3
Essex	7	Nipissing	1	Victoria	3
Frontenac	4	Norfolk	7	Waterloo	11
Glengarry	3	Northumberland	3	Welland	5
Grenville	8	Ontario	9	Wellington	26
Grey	4	Oxford	16	Wentworth	11
Haldimand	4	Parry Sound	1	York	42
Halton	4	Peel	8		333
Hastings	7	Perth	6		

From Other Provinces of the Dominion.

Alberta	3	New Brunswick	1	Saskatchewan	2
British Columbia	16	Nova Scotia	7		36
Manitoba	1	Prince Edward Island	6		

From Other Countries.

British West Indies	1	Panama	1	South Africa	2
England	6	Scotland	2	United States	14
					26

Ages and Religious Denominations.

The limits of age in the General Course, 1915 ranged from 17 to 36 years. The average age was 22.

Anglican	71	Evangel. Association	1	Methodist	130
Baptist	25	Friends	9	No Religion	5
Christadelphian	1	Greek Orthodox	1	Presbyterian	133
Congregational	3	Lutheran	2	Roman Catholic	10
Disciples of Christ	2	Mennonite	2		

The chief falling off was naturally in the General Course. Calls for enlistment and demands at home owing to the shortage of labor were the obvious causes. Altogether 444 graduates and undergraduates have enlisted for active service and 38 have thus far made the supreme sacrifice. The Officers' Training Corps, which was inaugurated at the College shortly after the war broke out and which conducts drills twice weekly, has been a very influential factor in training men for service.

A party of Toronto business men visiting the O.A.C.

In order to avoid making avoidable demands on labor, building operations have been curtailed as much as possible. Plans were finally approved for a new Boys' Residence, but construction was deferred until after the war. Much needed alterations have, however, been made in the Chemistry Building. A new wing has been added and the entire interior remodelled, thus giving greatly increased laboratory and class-room accommodation for this important department.

COST OF GROWING CROPS

Important results were obtained during the year as the result of the recent inauguration of a cost accounting system. This was adopted with the double purpose of securing a record of the operations on the College Farm and evolving something which might be of value to the average farmer. The tables on adjoining pages are the result and will well repay careful scrutiny.

COST OF PRODUCING CROPS ON THE COLLEGE FARMS IN 1915.

Crop	Acres	Rent of Land	Use of Bldgs.	Seed	Man labor	Horse labor	Use of machinery	Twine	Extra labor, threshing	Manure applied	Interest	Total cost	Value unexhausted manure and labor and seed	Value straw	Net cost	Total yield	Yield per acre	Cost per bushel or ton
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	Bushels	Bushels	$ c.
Barley	36	180 00	60 00	44 80	182 40	170 60	67 45	8 25	7 00	.....	20 00	740 50	.....	72 00	668 50	2,040	56.6	36⅛
Oats	16	80 00	32 00	25 60	96 80	79 35	31 37	5 52	3 50	3 00	9 84	366 98	.....	40 00	326 98	905	56.6	31⅛
Oats	20	100 00	40 00	34 00	94 67	78 58	31 07	4 40	4 38	.....	9 35	296 45	.....	65 00	331 45	1,132	56.6	29¼
Oats	20	100 00	.....	32 00	99 81	97 40	38 50	4 45	17 15	27 75	12 38	429 44	13 87	32 00	383 57	991	49.5	38⅝
Oats	10	50 00	15 00	16 00	35 79	40 73	16 10	2 25	6 75	.....	4 63	187 25	.....	20 00	167 25	480	48.0	34⅝
Oats	40	200 00	60 00	64 00	189 81	206 51	81 64	9 35	28 50	.....	20 37	860 78	.....	100 00	760 78	2,600	65.0	29¼
Oats, all fields	106	530 00	147 00	171 60	516 88	502 67	198 68	26 57	50 28	30 75	56 57	2,240 90	13 87	257 00	1,970 03	6,108	57.6	32¼
Wheat	11	55 00	22 00	25 20	135 17	141 36	55 89	5 10	.....	.....	16 07	455 79	.....	32 00	423 79	550	50	77
Mangels	10	50 00	48 00	4 40	189 35	124 66	49 43	.....	.....	82 50	14 67	563 01	68 31	.....	494 70	10,540	1,054	04.7/10
Turnips	6	30 00	24 00	1 80	97 00	71 16	28 14	.....	.....	52 50	8 72	313 42	26 25	.....	287 17	2,860	476	10
																Tons	Tons	
Alfalfa	20	100 00	32 00	133 34	72 78	44 72	17 68	.....	.....	.....	13 42	413 94	66 67	.....	347 27	44¾	2½	7 76
Clover	34	170 00	65 00	68 88	57 38	46 33	18 31	.....	.....	.....	6 36	432 26	.....	.....	432 26	66¼	1	6 53
Clover	22	110 00	30 00	46 20	40 17	21 61	8 54	.....	.....	.....	3 92	260 44	.....	.....	260 44	32½	1½	8 00
Timothy	40	200 00	55 00	.....	45 45	29 03	11 47	.....	.....	.....	2 86	343 81	.....	.....	343 81	52	1	6 61
Corn Silage	21	105 00	33 60	9 85	166 10	205 97	81 43	15 75	.....	156 50	15 94	792 14	136 83	.....	655 31	190	9	3 45
Corn Silage	18	90 00	28 80	9 82	153 87	169 74	69 11	13 50	.....	45 00	13 76	613 60	38 74	.....	574 86	135	7½	4 25
Corn Silage	11	55 00	17 60	5 01	90 45	112 12	44 33	8 19	.....	.....	6 50	339 20	.....	.....	339 20	77	7	4 41
" " all fields	50	250 00	80 00	24 68	410 42	487 83	194 87	37 44	.....	210 50	36 20	1,744 94	175 57	.....	1,569 37	402	8	3 90

METHOD OF COMPUTING COST OF HORSE LABOR.

Costs.		Credits.	
1915			
Apr. 1...Inventory value of 15 farm horses	$2,965 00	Sale of 1 old horse	$43 00
Inventory value of feed and equipment on hand	899 05	70 loads manure at 75c.	52 50
Aug. 15...51 tons, 1,985 lbs. hay at $12. (from Sec. 1) ..	613 90	131 loads manure at $1.00	131 00
Dec. 1...9 tons straw at $4.00	36 00	1915	
8 tons straw at $5.00	40 00	May 1...Seed oats for 106 acres, 1915 (taken from feed charged horses on April 15th)	182 00
3,510 bus. oats from field 1, 2, 6, 7, 9 and 10..	1,578 50	1916	
1916		Mar. 31...Feed and bedding for 15 horses of other departments at $83.88	1,258 20
Mar. 31...Bran for year	310 50	" 21...Inventory value of 15 horses	2,865 00
Drugs for year	18 50	Inventory value of feed and equipment on hand	798 30
Shoes and shoeing for year	115 57	Net cost of horse labor for year	2,644 72
Blanket for year	9 25		
2 new horses	610 00	Net cost horse labor $2,644 72	
3,215 man hours (feeding, cleaning, etc., at 15 1-10c.)	485 47	Total hours worked by horses 24,537	
Use of buildings	105 00	Cost per hour ..... .10¾c.	
Interest on money invested at 5%	188 18		
	$7,974 92		$7,974 92

METHOD OF COMPUTING COST OF MACHINERY.

Costs.		Credits.	
1915		1915	
Apr. 1...Inventory value of farm machinery	$2,027 00	July 1...Sale of 2 old binders	$65 00
July 1...2 new binders	260 00	1916	
1 corn cultivator	43 00	Mar. 31...Inventory value of machinery	1,979 00
" 10...1 Gurney scale	125 00		$2,044 00
Sept. 1...1 gang plow	32 00	Net cost machinery for year	1,049 77
1 blizzard cutting box	170 00		
Oct. 10...1 manure spreader	85 00	As practically all machinery was used in connection with horses, the number of hours machinery was used is supposed to be same as hours that horses worked.	
1916		Net cost of machinery for year $1,049 77	
Mar. 31...General repairs and oil for year	168 54	Number of hours worked by machinery	24,537
252 man hours (storing, repairing, etc. at 15 1-10c.)	37 95	Cost per hour	4¼c.
71 horse hours (storing, repairing, etc. at 10¾c.)	7 63		
Use of buildings	37 50		
Interest on money invested at 5%	100 15		
	$3,093 77		$3,093 77

Summarizing the year's operations it is found that after eliminating all expenses for purely instructional and experimental purposes, taking credit for all labor and services rendered other Departments of the College, and deducting the salary of a superintendent, the Farm proper paid all expenses and 2 1/24 per cent. interest on a total investment in land, buildings, live stock, machinery and working capital of $97,697.26.

Of the farm crops, with the exception of turnips, corn silage and potatoes (which were a failure), all were grown at a profit.

Of the live stock the sheep and swine each showed a profit after paying all expenses, interest, labor and housing, of over 12 per cent. The dairy herd of 90 head, after paying for feed, bedding, service fees and other expenses, had $2,787.00 to pay for labor, interest and use of buildings on an investment of $14,000. The beef herd, which is small, did not make quite as good a showing in the figures, though prices received at the sale later in the year disclosed that much too conservative an estimate was put on the increased value of the herd during the year.

LIVE STOCK RESULTS

Careful figures, given in detail in the regular College Report, were kept as to the dairy herd. They showed that sixteen individuals gave over 10,000 lbs. of milk and averaged about 15,000, the highest being 20,110 from "Young Springwood," a five-year-old pure-bred Holstein. She also headed the herd with a profit of $183.50 over cost of feed. Measured by the feed consumed, however, a three-year-old Holstein, "Mercena Rue Rattler," headed the list with a production of 8,188, and showing a return of $2.53 for each $1.00 worth of feed consumed. Third from this standpoint was a two-year-old Ayrshire, "Bird's Minnie 2nd," with a total production of 6,514 and showing $2.43 for each $1.00 worth of feed consumed. The cost of producing one hundred pounds of milk as far as feed was concerned ranged from 56¾c. to $1.25.

An interesting experiment was conducted as to the relative cost of stable feeding and summer pasturing, the results being as follows:

(1) Nine cows fed in stable showed an average annual record of 14,048 lbs. of milk and 528 lbs. fat, and produced a profit of $89.35 from $119.04 worth of feed, returning $1.72 for each $1.00 worth of feed consumed.

(2) Nine cows pastured during summer, of same lactation periods and same per cent. of fat as stable fed cows, showed an average annual record of 12,361 lbs. milk and 468 lbs. fat, and produced a profit of $95.38 from $86.26 worth of feed and pasture, returning $2.10 for each $1.00 worth of feed consumed.

In regard to feeding young pigs a four months' comparison of the relative value of tankage, a concentrated by-product from the abattoirs which should not constitute more than 10 per cent. of the meal ration, and skim milk resulted in favor of the former. Tankage fed with wheat middlings and ground barley produced a gain of 100 lbs. for $3.41 as compared to a cost of $4.75 where skim milk was fed with the same ration. In other words, tankage at $2.64 was more economical than skim milk at 25c. cwt., practically as cheap in fact as skim milk at 10c. cwt.

SUCCESSFUL AUCTION SALE

Three years ago it was decided to adopt the auction sale method of disposing of the surplus stock on the farm. The results have been very satisfactory. The sale is acquiring a reputation for quality and good values. For example, a white Shorthorn bull purchased at the College sale two years ago for less than $300 was fitted

by the purchaser for the show ring and during the past year won high honors at the big shows including the Chicago International.

At the 1916 sale eight lots of Scotch Shorthorns sold at an average of $359.00 each. Fifteen head of Holstein cattle, including some small bull calves, made an average of $148.00 per head. Two fat steers sold at 14½c. and 11c. per pound respectively. Thirty-six young sows averaged slightly over $30.00 each, and a few grade cattle and sheep also brought satisfactory prices. The total proceeds of the sale amounted to $7,725.15.

FIELD HUSBANDRY DEPARTMENT RESULTS

Like all other field crops throughout the Province, the crops on the experimental plots were affected by the unusual season. Results of interest and importance, however, were obtained. In the matter of oats the results of previous years were confirmed. The season completed ten years in which the tests of O.A.C. No. 3 and O.A.C. No. 72 have been carried on. As an early oat the O.A.C. No. 3 showed an average yield of 80.13 bus. per acre, compared with 72.48 bus. per acre of the Daubeney. As a later variety O.A.C. No. 72 showed an average yield of 87.41 bus. per acre, compared with 70.38 of the Banner variety. These new varieties also continue to maintain their lead in field crops and grain competitions, and their rapid extension is obviously desirable in the interests of this the largest of Ontario's grain crops.

A new variety of fall wheat developed on the farm plots is being distributed for co-operative tests for the first time this fall. It is known as O.A.C. No. 104 and is the result of a cross between Dawson's Golden Chaff and Bulgarian. On the farm plots in the tests conducted for the past five years it has surpassed both its parents in yield per acre and in bread-making it is almost equal to the Bulgarian.

Although experimental work in the production of root seeds has been carried on for the past eight years, a new importance has attached to the work during the past two years as a large proportion of Ontario's seed was imported from Europe prior to the war. Results secured show that seeds of mangels, turnips and carrots can be produced of a very high quality, especially of mangels. An extensive distribution of both seeds and roots of the Yellow Leviathan variety of mangels was made in the spring of 1916, but the very unfavorable season neutralized the results.

Many years of study on the part of the Department of the problem of potato production was summed up in a comprehensive bulletin issued during the year. The late varieties particularly recommended are Empire State, Davies' Warrior, Dooley; of the early varieties Extra Early Eureka and Irish Cobbler. There are far too many varieties grown in Ontario at the present time and the need is the production of larger quantities of standard varieties. Although the crop of the past year was almost cut in half by reason of the weather it was found to be reasonably free of disease.

MANY SOILS NEED LIME

Good progress has been made during the year with the soil survey being conducted under the Chemistry Department. The district west of a line between Georgian Bay and Toronto has been completed and a map showing the various types of soils over this area is being prepared.

The demonstration plots showed up well in spite of the weather. The conclusion has been enforced that large areas of Ontario soils need lime. Clay soils particularly need it, as do also sour swamp soils. Farmers should find out whether their soil is deficient in lime and get a good supply if necessary.

BUTTER AND CHEESE MAKING

In the Dairy Department some experiments were carried on of great interest to those engaged in butter-making on the farm. The conclusions arrived at were as follows:

(1) With one exception, variations in the speed of eight cream separators from six revolutions of the handle per minute above and below normal speed had little effect, except to cause a decrease on the percentage of fat (about 3 per cent.) in the cream when below normal, and an increase (3 per cent.) when above normal speed.

(2) An increase in the temperature of the milk at the time of separating from 80 degrees to 90 degrees F. and from 90 degrees to 100 degrees had very little effect on results, except that the fat in the cream averaged about 1 per cent. lower separating at 100 degrees as compared with separating at temperatures of 80 degrees to 90 degrees F. This is contradictory to the results in 1915.

Portion of the exhibit of the Department at the Canadian National Exhibition.

(3) Variations of different depths of milk in the supply tank of the separator from full to one-half and one-quarter full had very little effect on results, except that less than a full supply of milk in the supply can tends to reduce the capacity of the machine about 20 lbs. per hour.

(4) A variation from 3 to 4.1 in the percentage of fat in the milk separated had little effect except that the milk containing the higher percentages of fat, averaging 3.8, produced cream testing an average of 31.3 per cent. fat, while milk averaging 3.1 per cent. fat separated under similar conditions with eight different types of machines averaged 26.3 per cent. fat in the cream. Rich or high testing milk produces higher testing cream than low testing milk, other things being equal.

Rennet has been one of the big problems of the cheese-maker during the past

season owing to the short supply and high price. Consequently attention was devoted to the problem of home-made rennets and rennet substitutes. Fairly good results were secured with home-made rennet, showing that it is practicable to make it at the cheese factory where a supply of calves' stomachs are available. Pepsin as a substitute for rennet was also tested out and found satisfactory, but a combination of pepsin and rennet is regarded as preferable to the pepsin alone.

CULTURES SENT OUT

A total of 2,166 cultures of legume bacteria for seed inoculation were sent out, made up as follows:

Alfalfa, 1,371; Red Clover, 443; Alsike, Vetch, Sweet Peas, Peas, Beans, White Clover, Sweet Clover, Crimson Clover, Mammoth Clover, 352.

Distribution of alfalfa by provinces was as follows:

Ontario, 803; British Columbia, 439; Saskatchewan, 49; Alberta, 60; other provinces, 20.

Although no reports of results were asked for this year many of our patrons sent in reports, all of which were favorable to the inoculation.

A total of 113 lactic cultures and 22 Bulgaricus cultures were sent to creameries and cheese factories.

BACTERIZED PEAT AS A FERTILIZER

Some time ago the press contained reports of a claim made by Prof. Bottomley, King's College, London, England, that bacterized peat had a considerable value as a fertilizer. Efforts were made to secure information as to the detailed work on which the claim was based but no replies were received to enquiries. In the meantime, however, experiments have been carried on by the Bacteriological and Chemistry Departments and interesting, though not conclusive, results have been secured.

A sample of dry peat was divided into five lots and filled into large galvanized iron drums with perforated bottoms. The peat was then thoroughly worked up to aerate. No. 1 was kept as a control. Lime in varying quantities was added to Nos. 2, 3 and 4, no lime being added to No. 5. Mixed soil-bacterial cultures growing in flasks of bouillon were then added to all samples, except No. 1, to this a volume of water equal to the volume of bouillon was added. All samples were then thoroughly mixed and moistened with water and placed at a temperature of 25 degrees C. for a month, being thoroughly stirred up every few days. Chemical analyses and bacterial counts of the peat were made before treatment, again after two weeks and after four weeks. All samples were then heated in the autoclave at 15 lbs. pressure for one hour. Rich cultures of Azotobacter, Pseudomonas radicicola and cellulose fermenting bacteria growing in Ashby's solution were then added to samples 2, 3, 4 and 5, and thoroughly mixed in and all were then placed at 25 degrees C. for two months. Each sample was stirred up every week and water added sufficient to keep moist. Chemical tests and bacterial counts were made twice during this period.

A poor sample of soil containing much subsoil was obtained and divided into five lots. With this soil was mixed the five lots of bacterized peat, each in three different percentages: 0.5 per cent., 2.0 per cent. and 10.0 per cent. Eight seven-inch flower pots were then filled with each mixture, and four of these were sown with radish and four with lettuce seed. The lettuce germinated so poorly that no satisfactory deductions could be drawn from the test. The radishes, however, germinated well and later showed that with each increase of bacterized peat there

was an increase of plant growth. After three months from time of sowing the radishes were pulled and weighed, giving the following results:

Peat Lot 1.....	Average yield of radishes from 4 pots of soil— 0.5% peat	.... 35.5	gms.
	" " " " " " " " " " — 2.0% "	.... 41.75	"
	" " " " " " " " " " —10.0% "	.... 63.25	"
Peat Lot 2.....	Average yield of radishes from 4 pots of soil— 0.5% peat	.... 44.66	gms.
	" " " " " " " " " " — 2.0% "	.... 77.0	"
	" " " " " " " " " " —10.0% "	.... 87.0	"
Peat Lot 3.....	Average yield of radishes from 4 pots of soil— 0.5% peat	.... 35.50	gms.
	" " " " " " " " " " — 2.0% "	.... 59.25	"
	" " " " " " " " " " —10.0% "	....110.00	"
Peat Lot 4.....	Average yield of radishes from 4 pots of soil— 0.5% peat	.... 28.25	gms.
	" " " " " " " " " " — 2.0% "	.... 78.50	"
	" " " " " " " " " " —10.0% "	....134.25	"
Peat Lot 5.....	Average yield of radishes from 4 pots of soil— 0.5% peat	.... 39.33	gms.
	" " " " " " " " " " — 2.0% "	.... 57.75	"
	" " " " " " " " " " —10.0% "	....135.00	"

All plants from Lot 1 (unbacterized peat, control) were small, poor and unmarketable. Plants from Lots 2, 3, 4 and 5 where 0.5 per cent. peat was added were mostly small, some of them being unmarketable. Where 2 per cent. peat was added the results were good, the majority of radishes being of marketable size and of good quality. Where 10 per cent. peat was added the radishes were extra fine and large and of good quality. The addition of lime to the peat did not appear to have any beneficial effect, as Lot 5, which had no lime added to it, gave as good results on the whole as any of lots 2, 3 and 4.

It would appear from the above that the bacterial treatment to which this sample of peat was subjected was decidedly beneficial in making the peat useful as a fertilizer. Further experiments, however, are necessary to permanently establish this conclusion with regard to other samples of peat, and also as to whether it would be a practical paying proposition to treat large quantities of peat as a commercial undertaking.

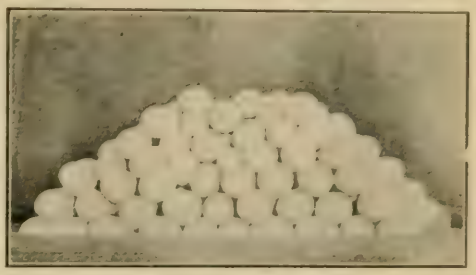
NEW RECORDS IN EGG PRODUCTION

One of the outstanding achievements of the Poultry Department was the record-making performance of a Barred Plymouth Rock hen. In 355 days she laid 310 eggs, thus breaking the world's record for any hen of the breed up to that time. Unfortunately at the conclusion of the 355 days she was overcome by the August heat and died. With eleven more days to complete the College year, and laying an egg each day as had been the case immediately before her untimely demise, she gave every promise of breaking the world's record for any breed. As it is she holds the record for any breed in Canada and for her own breed in the world up to that time.

The record-breaking Barred Rock.

Aside from this outstanding case there was a general improvement in egg production shown by the breeding work. Thirty per cent. of the Barred Rocks produced 200 eggs or more in twelve months, whereas it is figured a hen which lays 100 eggs in that period is paying her way. Furthermore, the

percentage of low producers was less and the size, color and hatching power of the eggs showed improvement.



The eggs she laid.

Another important fact brought out goes a long way to explain the secret of winter egg production. It is well known that the price of eggs is highest in October, November and December, the months of lowest production. The results in the poultry department show that early hatching is essential to early laying. March hatched pullets in the three months mentioned laid 37 eggs each; April hatched, 21; May hatched, 9. Taking the eggs at 40c. a dozen the value would be $1.23 for March pullets, 70c. for April and 29c. for May. Two years' work demonstrates that from March 20th to April 20th are the most profitable dates for hatching. Where artificial incubators are not used, however, the usual date of hatching is May, hence the shortage of eggs in the early winter months as the yearling hens seldom lay more than 10 per cent. in these months.

TWO NEW DISEASES

The work of the Botanical Department included research on two diseases which are believed to be new to Ontario. One is the rust on cultivated snapdragons, a disease important to florists, and the other a damping off disease of young tomato plants. In both cases the nature of the trouble was closely studied and information given as to prevention and treatment.

Experiments in the control of late blight of celery were continued and the results confirmed the results of previous years to the effect that loss from late blight can be prevented by spraying with Bordeaux mixture, formula 4-4-40, starting when the plants are in the seed bed and spraying at intervals of ten days or two weeks throughout the growing season.

ONTARIO GROWN VEGETABLE SEEDS

In addition to carrying on plant breeding work in strawberries and apples, the Horticultural Department has done important work in developing and testing home grown vegetable seeds to take the place of those previously imported from Europe. Seeds which have proven exceedingly satisfactory in trial tests have been produced by this Department in the following crops:

Beet—Detroit Dark Red.
Cabbage—Glory of Enkhinzer.
Carrot—Chantenay.
Celery—Paris Golden Self-blanching and Winter King.
Lettuce—Grand Rapids.
Onion—Southport Yellow Globe.
Sweet Corn—Yellow Bantam.

Special attention should be directed to the work of the department in developing O.A.C. strains 114 and 415 of Paris Golden Self-blanching celery. This is believed to be the first time this strain has been developed in America, as in the

past growers have insisted on getting their seed from Europe. Seed of green varieties of celery has been produced in California. Quantities of the new O.A.C strains are being distributed among growers for further test. The Department is also co-operating with the growers in the production of other vegetable seeds.

PROGRESS IN DRAINAGE

It is scarcely necessary to do more than give the statistics to show the continued success and usefulness of the drainage work carried out under the direction of the Physics Department.

SUMMARY OF SURVEYS, 1906-1916, INCLUSIVE

Year.	Applications.	Surveys	Acres Surveyed	Miles of Drain	Demonstrations.	
					No.	Average Attendance
1906	15	15	500	45	.....	.....
1907	126	70	3,500	350	.....	.....
1908	166	100	5,000	510	43	.....
1909	302	179	5,157	613	48	18.0
1910	518	383	14,672	1,800	132	23.6
1911	414	327	15,211	1,864	142	17.4
1912	430	293	17,212	2,278	70	21.7
1913	290	247	13,705	1,713	56	20.3
1914	296	250	13,386	1.673	23	20.9
1915	291	263	15,336	1,917	8	12.8
1916	367	318	14,694	1,731	4	65.0
Total...	.....	2,445	118,373	14,494	526	.....

In addition to the surveys made for individual farmers a number of demonstration plots were conducted on different types of soil with results as follows:

RESULTS FROM DRAINAGE ON LOAM SOIL

Plot.	Post Office.	County.	Crop.	Yield per acre in bus.		Bushels increase.	Value of increase per acre
				Drained.	Undrained.		
1	Glanford	Wentworth ...	F. Wheat .	25.4	15.0	10.4	13.52
2	Cayuga.....	Haldimand ...	"	23.0	11.0	12.0	15.60
3	Harrowsmith ...	Frontenac	Oats	26.6	5.7	20.9	10.45
9	Belleville	Hastings	Barley ...	26.0	12.2	12.8	11.04
4	Stewart's Hall..	Peterboro.....	Hay.....	2.65 tons	1.20 tons	1.45 tons	11.60

RESULTS FROM DRAINAGE ON CLAY SOIL

Plot.	Post Office.	County.	Crop.	Yield per acre in bus.		Bushels increase.	Value of increase per acre
				Drained.	Undrained.		
5	Beachburg.....	Renfrew.....	S. Wheat .	15.76	11.82	3.94	5.12
6	Stevensville	Welland.....	F. Wheat .	25.00	22.10	2.9	3.77
7	Hagersville.....	Haldimand ...	Oats	32.7	22.4	10.3	5.15
8	Norval	Halton	Oats	27.1	38.3	8.8	4.40

RESULTS FROM DRAINAGE OF HEAVY CLAY SOILS FOR YEAR 1916.

Plot.	Post Office.	County.	Crop.	Yield per acre in bus.		Increase per acre.	Value of increase per acre
				Drained.	Undrained.		
10	New Liskeard ..	Temiskaming .	Peas	42.0	42.0	0.0	0.00
12	Rainham Centre.	Haldimand ...	Hay.....	?	?	0.0	0.00
13	Inglewood	Peel.....	Hay.....	3.04 tons	3.02 tons	0.02	0.00
14	Hornby.....	Halton	Barley ...	20.00	20.00	0.0	0.00

ONTARIO VETERINARY COLLEGE

The number of students in attendance at the College from October, 1915, to November, 1916, aggregated 230 all told. They came from various Provinces and States of North America as well as some other countries. Canada supplied the largest share, viz., 171, United States came next with 52, and other countries supplied 7. Of the students coming from all Canada more than half of them came from Ontario, there being 94 students from this Province alone.

The continuation of hostilities in Europe seems to have had a rather detrimental but not unnatural effect on the attendance at this College, as the number of students are less than they were in the years which antedated the great war.

The College has on its Honour Roll 132 graduates, 16 undergraduates and 7 of its faculty in various ranks of the army. Three of our undergraduates were granted leave of absence from the army, and permitted to rejoin their classes in the autumn of 1915, in order that they might graduate in the spring of 1916, after which they returned to the front as commissioned officers.

The continued call for men has caused 52 students to join the Officers' Training Corps at the University, where they get instruction in military tactics and drill without interfering with their Veterinary studies.

In the month of April, 1916, 76 of the Senior class graduated at the closing exercises of the College, and subsequently 9 of them were granted the degree of Bachelor of Veterinary Science (B.V.Sc.) by the University of Toronto.

The system of teaching has not varied much from former years although some courses have been extended and the increased equipment has made others more complete.

During the year the College was allotted space in the Government Building at the Canadian National Exhibition, it was installed with numerous specimens taken from the Museum that illustrated many methods used in teaching Veterinary Science at the College. It seemed to attract a good deal of interest and attention and no doubt advertised the College in a desirable way.

The exhibit consisted largely of anatomical specimens and diseased tissues, together with instruments used in surgical operations. One of the most attractive features of the display was a life size model of a horse which separates into 97 pieces and shows about 3,000 points for illustrating Anatomy. It was dissected into numerous parts and those visitors who were familiar with the Anatomy of the horse were struck with the accuracy of the illustrations, while others were greatly pleased to see the internal structures of the animal so clearly demonstrated.

BUREAU OF INDUSTRIES

The value of the publications, especially of Bulletins, has been further attested by the continued requests for information. To meet this demand a large supply of most timely Bulletins, in simple, concrete form, have been issued. The following figures show the work in that connection:

*195 Insecticides and Fungicides	8,000
*198 Lime-Sulphur Wash	10,000
*209 Farm Forestry	6,000
235 Sweet Clover	6,000
236 Home Canning of Fruit and Vegetables	40,000
237 The Grape in Ontario	12,000
238 Lime and Its Uses in Agriculture	30,000
239 Potatoes	50,000
240 Bacterial Diseases of Vegetables	15,000
241 Peach Growing in Ontario	12,000
	199,000

The following Crop and Statistical Bulletins have been distributed:

Crop Bulletin 125, November, 1915	20,000
Crop Bulletin 126, April, 1916	7,000
Crop Bulletin 127, May, 1916	7,000
Crop Bulletin 128, August, 1916	7,000
Municipal Bulletin, No. 10	8,000

The distribution of the Annual Reports has been continued and the following are the figures of the numbers distributed:

Minister's Report	25,000
The Ontario Agricultural College	30,000
The Experimental Union	25,000
The Ontario Veterinary College	4,000
Agricultural Societies and Field Crop Competitions	20,000
Horticultural Societies	16,000
Vegetable Growers' Associations	8,000
Live Stock Branch	30,000
Stallion Enrolment Board	6,000
Farmers' Institutes, Part 2	4,000
Women's Institutes, 1 and 2	37,500
Dairymen's Associations	25,000
Entomological Society	3,500
Fruit Growers' Association	4,000
Beekeepers' Association	4,000
Bureau of Industries (Agricultural Statistics)	7,000
Bureau of Industries (Municipal Statistics)	7,000
	256,000

*Revised editions.

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AGRICULTURAL SOCIETIES' BRANCH

In spite of war conditions the year that has passed has been a banner one for the Agricultural Societies of this Province. The weather conditions were for the most part favorable, but a number of Societies found it necessary to apply for wet weather grants, as they had suffered losses in gate receipts. Out of the grant of $10,000 for this purpose, $6,272 were paid out to Societies entitled to same. The attendance at the Fairs and Exhibitions of Ontario during 1916 made up the large total of 1,722,776 persons. Marked improvement was noticeable in the exhibits of all kind of live stock and particularly so in the sheep sections. Poultry exhibits are also increasing largely everywhere and many Societies have purchased permanent wire coops, which add greatly to the appearance of the birds and the judge's work is much facilitated thereby.

No Short Courses for Departmental judges were held in 1916. These courses will, doubtless, be resumed in 1917, as they have proved highly satisfactory in the past.

Fall fairs retain their popularity.

FIELD CROP COMPETITIONS

Societies entering these Competitions were restricted to two crops in 1916. The number entering in the different crops was: Oats, 140; potatoes, 40; corn, 34; fall wheat, 7; barley, 7; spring wheat, 6; mangolds, 4; turnips, 3; peas, 2; clover, 1. Nearly 7,000 farmers took part and the interest is increasing every year. The exhibits from these Field Crop Competitions at the Fairs and Exhibitions of the Province were of a high standard and attracted great attention. Large financial benefits are accruing to the farmers who have entered these competitions, as they are able to sell their grain for prices much above the average and the careful cultivation of their fields and the destruction of weeds also result in increased quantity and better quality of grain available for seed purposes.

The printing of the scores of the competitors in the Appendix to the Agricultural Societies' Report has been the means in many cases of bringing buyer and seller together from far distant points with most satisfactory results. These scores also enable the competitor to see where the weak points in his crop are, so that he can make improvements and give greater care where necessary.

HORTICULTURAL SOCIETIES

There has been a wonderful growth in these Societies during the past year, the membership having now reached 16,000. The number of Societies also shows a steady increase, principally in Western Ontario. Application has recently been received for the organization of a large number of new Societies during 1917. The improvement that has been made in the cities, towns, and villages of Ontario through the work of the officers and members of these Societies is most gratifying. Many of the citizens are encouraged to take up vacant lot gardening, and notwithstanding that the past season was unfavorable for roots and vegetables, fine crops have been the result of the enthusiasm of these amateur gardeners.

ONTARIO VEGETABLE GROWERS' ASSOCIATION

Field Crop and Garden Competitions conducted by this organization have been proved of great value and the interest taken by all concerned will doubtless be the means of increasing the membership and also the financial returns of the competitors. The question of home-grown seed was discussed at the Convention, and progress is being made. Much of the seed grown in Ontario has proved quite as satisfactory as imported stock.

ONTARIO PLOWMEN'S ASSOCIATION

Interest in the work of this organization is increasing from year to year. At the Provincial Match held three years ago, 1,500 farmers were in attendance. In 1915, the number had increased to 4,000, and in 1916, possibly 20,000 people

At the ploughing match.

attended the annual gathering of this Association. Interest has been completely revived in the old-time plowing match and the young farmers, particularly, are taking an important part at local and provincial matches. In addition to walking plows in 1914, one tractor was in evidence. In 1915, six were in operation while in 1916 at the Provincial Match at "Meadowbrook Farm," Whitby, manufacturers of 25 of the most up-to-date light and heavy tractors from different parts of this continent gave demonstrations that were much appreciated by the thousands of people who watched these labor and time-saving devices. To show the rapidity with which the soil can be turned, one light tractor in 55 minutes dragging a two-furrow plow, plowed a measured acre. The fuel required was 3 gallons of kerosene oil.

Besides plowing, there was a large exhibit of all kinds of farm machinery, which could be operated by tractors, including threshers, binders, mowers, cultivators, milking and separating machines and electric generators suitable for rural communities. All of these latest improved appliances were carefully inspected by the farmers present.

LIVE STOCK BRANCH

During the year 1916, under the arrangement for the co-operative shipments of live stock to Western Canada, 366 animals have been shipped under the direction of this Branch. Up to the year 1916, the deficit, if any, was met by the Live Stock Associations, but beginning with 1916, the Ontario Government voted a grant of $1,000 to make good any deficit for that year. The following tables give the shipments for the last nine years and in detail the shipments for 1916:—

Year.	Horses.	Cattle.	Sheep.	Swine.	Total.
1908	22	74	14	15	125
1909	25	70	84	4	183
1910	39	51	36	7	133
1911	58	51	51	18	178
1912	51	45	24	20	140
1913	47	71	107	21	246
1914	49	97	34	20	200
1915	28	104	76	8	216
1916	59	185	100	22	366

NUMBER IN EACH SHIPMENT

——	Jan.	Feb.	Mar.	April 5th.	April 20th.	May.	June.	October.	Total.
Horses—									
Clydesdales	2	6	3	14	9	8	5	5	52
Shire				1		1			2
Percheron			1	1					2
Standard-Bred				1					1
Welsh Pony					1				1
Morgan						1			1
Cattle—									
Shorthorn	6	20	24	15	6	16	19	14	120
Aberdeen-Angus	4		2	3		1		1	11
Ayrshire				1				3	4
Holstein	1	2	2	1		1	1	7	15
Jersey			2						2
Hereford	16	1		4		6	2	4	33
Sheep—									
Leicester				1					1
Shropshire	2						8	34	44
Southdown							13	1	14
Dorset Horn							6		6
Oxford Down	6		6					22	34
Suffolk								1	1
Swine—									
Yorkshire	1	1					2	1	5
Berkshire		5					3	2	10
Tamworth							6		6
Hampshire				1					1
Totals	38	35	40	43	16	34	65	95	366
No. of cars	2	2	2	3	1	2	2	3	

POULTRY ASSOCIATIONS

Forty local Poultry Associations received grants for the fiscal year 1915-1916. At a large number of the meetings of the local Poultry Associations demonstrations and lectures have been held and it would seem that the poultry men in the Province were never more hopeful or enthusiastic.

HORSE SHOWS

The number of Horse Shows receiving assistance through the Live Stock Branch are less numerous than formerly but a number of the Associations have reported very successful shows. The war has necessitated the cancellation of a number of the larger shows of carriage and hunter classes.

PURE BRED SALES

A number of Associations have been formed in Ontario to co-operate in holding sales of pure bred stock. The Ontario Department of Agriculture through the Live Stock Branch gives financial assistance to these Associations. From two active Associations in 1913, the number has grown to eight in 1916.

STALLION ENROLMENT

The fourth year of Stallion Enrolment has now passed with the season of 1916. The Report of the Enrolment Board issued in 1916, gives the total number of stallions enrolled as 2,731, of which 1,905 were pure bred and 826 grades. Of the grades, no doubt, quite a number could be made eligible to be enrolled as pure breds, which would show that there are at least 70 per cent. of the stallions in the Province pure bred. Unsound grades will no longer be granted enrolment certificates and there will, therefore, be 85 unsound grades which received certificates in 1916 that will be refused certificates in 1917 and no doubt this number will be added to by the official inspection of October-November, 1916. While the Stallion Enrolment Act has met with some criticism in earlier years, the most progressive horsemen of the Province realize that the Act will eventually tend to the betterment of the horse industry and secure for the owners of mares the service of better sires.

WINTER FAIRS

The Ottawa Winter Fair, of January, 1916, was one of the most successful in its history. This Show gives the breeders of Eastern Ontario an opportunity to display their live stock, poultry, and seeds at a time when the farmers of that section have sufficient leisure to attend the Show.

The 1916 Ontario Provincial Winter Fair held at Guelph, December 1st to 8th, 1916, was most successful. The attendance was large and well distributed throughout the four days of the Show. The extended prize list in Beef Cattle brought out very strong classes in the Shorthorns and grades, it being possibly the best exhibit of beef cattle ever held at Guelph. Owing to lack of importation, some of the imported classes of Clydesdales were not so well filled but the Canadian-bred Clydesdales made up for the deficiency both in number and quality. The sheep men of Ontario deserve the utmost credit for while winning honors at Chicago they still left enough sheep for the Guelph Winter Fair to make it one of the most successful sheep shows in its history. The breeding classes in swine were exceptionally well filled and there is no doubt that the quality of the bacon and butcher classes was of the highest order.

While 1916 did not prove the best of years for the production of seed, the entries at Guelph passed all previous records in number and the quality was at least equal to that exhibited at former shows.

The record entries of 1915 in poultry made some poultrymen believe that it could not be surpassed but the 1916 Show excelled the 1915 both in the number and quality of entries.

One feature that proved of great interest to the visitor was the demonstration in the market classes of animals, showing the live animal and the carcasses of one of corresponding size, quality and finish. There were also pens of bacon hogs illustrating to the feeder the most desirable type compared with those of faulty conformation or faulty from improper fitting.

Of the various demonstrations, the one showing the proper system of killing and fitting poultry for the market, attracted the most interest and the lectures relating to this demonstraion were fully attended at every session.

Taking one Department with another, the 1916 Show was possibly the best balanced of any Winter Fair held at Guelph.

ENCOURAGEMENT OF THE SHEEP INDUSTRY

In 1916, five flocks, six shearling ewes in each flock, were given on a competitive basis, one flock to each of the following counties: Dundas, Peel, Grenville, Glengarry and Waterloo. The management of these flocks will be closely watched by the Department and it is hoped the plan will result in the double effect of encouraging sheep raising in the respective localities and in making available information which will be of general value.

In addition to the regular work of the Live Stock Branch, the Director's time has been taken up to some extent with the work of the various Live Stock Associations, he being secretary of the following Associations:—

Dominion Cattle Breeders' Association.
Canadian Sheep Breeders' Association.
Canadian Swine Breeders' Association.
Ontario Horse Breeders' Association.
Ontario Sheep Breeders' Association.
Ontario Swine Breeders' Association.
Western Ontario Poultry Association.
Western Ontario Seed Growers' Association.
Ontario Large Yorkshire Swine Breeders' Association.
Ontario Berkshire Swine Breeders' Society.

INSTITUTES BRANCH

The regular Institute campaign of 1915-16 was on about the same scale as in the previous winter. Interest on the part of the farmers was very keen, an increased tendency being shown to ask questions and take part in the discussions especially in regard to the breeding and feeding of live stock. Where the advertising was thorough, the attendance was all that could be expected. As will be seen from the following statement, the activities of this Branch included a number of features besides the regular Institute meetings.

Regular and Supplementary Meetings.

Farmers' Institutes	54,319
Women's Institutes	225,391

Conventions, Demonstration-Lectures, etc.

Women's Institute Demonstration-Lectures	21,643
Farmers' and Women's Institute Conventions	13,500
Seed and Live Stock Judging Classes	12,500
Cheese Factory and Creamery Meetings	9,337
Total	336,690

FARMERS' CLUBS

While the interest in Farmers' Clubs is increasing from year to year, especially among the younger men on the farm, the number is not at all in keeping with the need for local organizations where the farmers may consider from month

Farmers' Club guided by District Representative, on an automobile trip to inspect the good stock.

to month or oftener throughout the winter season those agricultural problems of special importance in the locality concerned. The possibilities of the local farmers' organizations are unlimited, not only as a channel for the dissemination of information contained in Government publications and our splendid agricultural

press, but the interchange of definite information and ideas based upon practical experience gained in the neighborhood. Co-operation in producing, buying and selling should be prominent features in the Club work, and the wideawake progressive Club besides emphasizing agriculture will look to the social and intellectual life of the community. Interchange of speakers and a series of debates among Clubs conveniently located have been prominent features.

The Department is ready to give liberal assistance in speakers and literature to the local organizations, and it is to be hoped that the day will come when there will be a Farmers' Club in every rural section where we have a Women's Institute. These two organizations have many interests in common and they may be mutually helpful. Where you find both a Women's Institute and Farmers' Club one is about sure to have an intelligent attentive audience when Institute lecturers are in attendance.

BOARDS OF AGRICULTURE

The plan referred to in last year's report for the reorganization of Farmers' Institutes, which have rendered such excellent service to the farmers of the Province for over 30 years, now, has materialized in 70 out of the 78 districts in old Ontario. The plan will no doubt be extended to the northern parts of the Province soon after peace has been secured.

The new organization differs from the Farmers' Institute, in that it is made up of directors composed of persons representing some definite organization or municipality. The directorate is made up as follows:—

(*a*) Two representatives from each Farmers' Club and Junior Farmers' Association.
(*b*) One representative from each Agricultural Society.
(*c*) One representative from each township.
(In cases where there is no Farmers' Club, Junior Farmers' Association, or Agricultural Society in the township, the Township Council will be entitled to appoint two representatives instead of one.)
The representatives appointed under (*a*), (*b*) and (*c*) should be active farmers.
(*d*) District Representative of the Provincial Department of Agriculture.
(*e*) Three representatives from the District Women's Institute, one being the district secretary and the other two being elected at the district annual meeting.
(If representatives are not duly appointed, then the president, vice-president and secretary will be considered as members of the Board.)
(*f*) The president, vice-president and secretary-treasurer of the Farmers' Institutes for the previous year will be directors for the first year; and in succeeding years the ex-president and ex-vice-president of the preceding year will be directors.
(*g*) The Board will have power to add to its numbers.
Co-operative Societies, Granges and other agricultural organizations, as well as Boards of Trade and Publicity Associations, should be considered when choosing additional directors. The aim should be to have at least two directors in each locality where a meeting or judging class is to be held.

The various organizations and departments working in the interests of the farmers, are now so numerous that it became necessary to have a central organization through which plans could be made for meetings, short courses, demonstrations, etc., thus avoiding unnecessary overlapping and securing the co-operation of all local interests when work along agricultural lines was to be undertaken.

THE OBJECT

The object of each Board of Agriculture shall be the dissemination of agricultural knowledge in its district, the development of local talent, to encourage the formation of Farmers' Clubs and to render them assistance, to encourage agricul-

tural co-operation, to secure the co-operation of all agricultural organizations, women's institutes, and representative men in the municipalities concerned, in planning for and holding meetings and short courses in the interests of Agriculture, Home-making and Community Improvement, at which demonstrations, lectures and discussions will be featured, to forward the interests of the district agriculturally, socially and educationally, in all legitimate ways, to stimulate a more general co-operation among the Farmers' Clubs, Women's Institutes, and other agricultural organizations, and to hold a general rally of the farmers of the district and their families at least once a year. The officers shall endeavour to bring the rank and file of the farmers into touch with the most successful local men, that the masses may become more conversant with the best and most profitable methods of farming, stock raising, dairying, fruit culture, and all activities connected with the industry of agriculture. The Board will be expected to co-operate with the District Representative in the various features of work under his direction.

The Boards have already become active in introducing a better road system in some of the counties, encouraging co-operation among the farmers, improving the schools of the district, etc.

The Board of Agriculture for West Elgin planned an auto trip when they visited a number of good stock, fruit, and grain farms in East Elgin. The accompanying illustration will indicate in a measure the success of this feature.

WOMENS' INSTITUTES

The statistical report for the year ending May, 1916, shows an increase along all lines. There were 30,335 members and 10,149 regular meetings were held with an attendance of 225,391.

Patriotic Work. $400,000.00 is a very conservative estimate of the contributions in cash and goods by the Institutes during the first two years of war. Weekly and fortnightly meetings for sewing are being held in many places, and most varied have been the methods for raising money. The collections of one Institute for patriotic work during the year, and this is representative of the majority, amounted to $2,388.34. The committee of one small Institute upon hearing that wool was to advance in price ordered $1,100 worth, and, when they announced what had been done, it was not long before the Institute members and their friends had subscribed the amount required. Home relief has not been overlooked and the Northern Ontario fire sufferers, Children's Shelters, Hospitals, etc., have received attention and support.

Demonstration Lecture Courses. There is an increasing interest from year to year in the Demonstration Lecture Courses of two weeks in "Food Values and Cooking," First Aid and Home Nursing," and "Sewing." Many of the Institutes which would otherwise take advantage of these courses are devoting their time to patriotic work. It has been demonstrated, however, in a number of cases that patriotic work has not suffered through the holding of these courses, as many new workers have been drawn into the Institute through the courses. There were fifty-five courses held in 1915-16, with an attendance of 21,643. Plans have already been made for the holding of sixty-nine courses for 1916-17, a number of these to be held in conjunction with the Short Courses in Agriculture arranged for by the District Representatives.

Conventions. The record attendance at the three Provincial Conventions held in the fall of 1916, at Ottawa, London and Toronto, gave evidence of the importance of the subjects announced for discussion. Some of these were:

"What the Rural Communities can do Toward Conserving Public Health," "The Comparative Values of Various Food Products at Present Prices," "Medical School Inspection," "Woman's Assets as a Worker When She Looks for Paid Employment," "The Blind and their Needs," "Woman's Responsibility During and After the War." The work of the Red Cross and other patriotic societies had a special place on the programmes, and various phases of Institute work were also discussed. In addition to the Provincial conventions, a number of county and district conventions were held.

Medical Inspection. Several demonstrations in Medical Inspection were given during the year. That at Gravenhurst was most successful, when four hundred pupils were examined. Three hundred were found to have unhealthy teeth, 130 had bad throats and many had adenoids, while a number of cases of defective

A Women's Institute Domestic Science Class—one of many.

hearing and eyesight were found. The inspection was followed by a clinic, when 22 of the worst cases were operated upon. The teacher reports that these twenty-two have made rapid progress in their school work since the operations.

Girls' Work. Through the Demonstration Lecture Courses and the general interest in patriotic work, many girls and young women have been drawn to the Institute. Their services are invaluable at the present time and will be an important factor in the future work of the Institute. In the spring of 1916, the Institutes Branch offered seeds to a few Institutes upon the condition that they would put in and care for gardens in accordance with instructions sent out by the Department. Some 250 gardens resulted and a keen interest was taken. The competitors were mostly young girls. The object in this work is to induce the people of the rural districts to use larger quantities of vegetables, and adopt improved methods in cooking and preserving the same. Plans are being made for an extension of this work in 1917.

DAIRY WORK

The year 1916 was the most prosperous year the Ontario Dairymen have yet experienced. While pastures were not so abundant as in the preceding year, and prices of necessary concentrates were high, the increased prices more than counterbalanced these obstacles to the industry. Cheese prices were unprecedentedly high during the past year, 18¼ cents being the average price paid for this valuable food product, an article of food which has been greatly in demand for the armies of Britain and her allies. The prices received for butter have also been good, and the output has also considerably increased from that of the previous year.

The value of the total dairy products of the Province for the year, including the output of powdered and condensed milk factories, dairy butter, urban milk supply, ice cream as well as the cheese and butter manufactured in our factories and creameries, is approximately $60,000,000. There were approximately 25,000,000 pounds of creamery butter and 130,000,000 pounds of cheese manufactured in Ontario during 1916.

Modern dairy barn where the equipment includes a milking machine.

During the year there were 999 cheese factories, 108 of which paid by test, and 167 creameries in operation in Ontario. There were 42,310 patrons of cheese factories, and 44,367 patrons of creameries. The dairy instructors made 14,503 sediment tests during the year, and the results of these tests are doing much to improve the quality of the milk supplied to factories, which in turn is having a beneficial result on both the quantity and quality of the manufactured product, an improvement which assists greatly in increasing the price which can be demanded for the output from our factories.

An increased number of herds are being tested, and Ontario can now boast of some of the best dairy cows found on the continent. The influence of these good herds is being extended so that a gradually increasing number of farmers are taking an increased interest in improved methods in breeding and feeding their grade herds.

Butter Grading. As a preliminary step to starting a plan for the grading of butter, the Department of Agriculture during the past year appointed an official grader, with headquarters at Toronto. His duties were investigational and educational.

In addition to the settlement of disputes arising from the sale and purchase of inferior butter, he was asked to report to this Department on the quality of all the butter he could see coming into Toronto, with the twofold object of ascertaining the quantities of the different grades of butter marketed; and, having this information, the Department could through the dairy instructors be able to reach the creameries and help the butter makers to overcome influences that were adversely affecting the quality.

Out of a great number of shipments examined it was found that 57 per cent. graded first-class 41 per cent., second-grade, and only 1 per cent. third-grade. During the warm weather extending from July 25th to September 25th, 54 per cent. of the butter graded less than first-grade, while during the month of October, 70 per cent. graded first-grade. This shows that in good weather, when the cream will care for itself, number-one grade butter is generally produced. Some creameries shipped throughout the hottest weather nothing but number-one grade butter, proving that under the best management, good quality can be maintained at all times. The information obtained will be the basis of further work next year.

As in former years, valuable dairy instruction has been given at the dairy department of the Ontario Agricultural College, Guelph, and the Kingston Dairy School. In addition to scientific dairy information given to the large classes attending those institutions experimental work of most practical value was carried on at each school.

DAIRY STANDARDS ACT

At the last session of the Legislature a Bill was passed dealing with the methods for paying for milk at cheese factories and also with the question of butter grading. The legislation has since been very generally discussed, and it has been regarded as one of the most important developments in the history of the dairy industry in the Province. In regard to the payment for milk at cheese factories the Bill provides that the butter-fat or butter-fat and casein should be the basis for payment instead of merely the weight as in the past. It was provided that this should be arrived at either by the straight fat test or by what is known as the plus two test the factor two being taken to represent the casein content. This would involve a very radical change in the method of payment, but it was contended that it would constitute a fairer basis, because the real value of 100 lbs. of milk in the making of cheese is based largely on its content of butter-fat and casein.

Another clause affecting the cheese factories provided that all whey should be pasteurized before being returned to the individual farms in the farmers' cans. The reason for this was largely sanitation and prevention of disease among stock.

In the matter of butter grading general provisions were laid down with a view to arriving at a basis by which cream might be paid for at the creameries on the basis of quality, not merely its butter-fat content. This would involve also the grading of butter and the selling of butter on Government certificates as to quality.

In introducing this legislation the Minister recognized that it was of very far-reaching importance and affected between 70,000 and 80,000 producers in the Province. Under these circumstances it was recognized that considerable education would need to be carried on in order to acquaint those concerned with the nature

of the Bill, with the reasons for it, and with the facts as to its possible results. Emphasis was laid on the necessity of taking every step possible to protect the quality of the Ontario product, particularly having regard to the competition to which it would in all probability be subjected at the termination of the war. Accordingly it was provided that the Bill would not come into effect for a period of one year and during the past few months the Department has carried on an educational campaign with a view to accomplishing the purposes mentioned. A pamphlet containing a copy of the Act, and the discussion thereon in the Legislative Committee was placed in the hands of all the producers and speakers provided for fall meetings, when the matter will no doubt be thoroughly thrashed out. Supplementing this the dairy officials in Eastern Ontario were requested to make tests of the actual amounts of cheese which could be made out of 100 lbs. of milk of varying butter-fat and casein content. The result of this work was a striking demonstration of the unfairness of paying for milk under the pooling system. A glance at the accompanying picture will clearly demonstrate the fact.

In the matter of the creamery side of the dairy industry, different steps were desirable. A special officer was appointed to carry on grading of butter in the city on the basis of samples sent in. In this way much information was obtained, which will be of value later in working out a system for the grading of butter. As intimated, it was recognized that the legislation was primarily of an educational nature, but being accompanied as it has been by practical work, it seems likely to be productive of very beneficial results to the dairy industry of this Province.

FRUIT BRANCH

Owing to the war, this Branch has devoted a great deal of its energies to the production, packing and shipping of fruit for the use of the soldiers and sailors in the hospitals of Great Britain and France. For demonstration purposes the Department has leased five commercial orchards in different parts of the Province. Three of these gave good crops, the others light crops, all of the fruit being put up in boxes and sent overseas. In addition several thousand boxes were purchased already packed, while over six thousand were packed by the Fruit Branch at the Pre-Cooling Station at Grimsby through the courtesy of the Dominion Department of Agriculture who placed this building free of charge at our disposal. Altogether some twenty-two thousand boxes of apples were shipped by the Province as a gift to the gallant men who are serving our country at the front.

Along the same lines, the Horticultural Experiment Station at Vineland continued the canning of tender fruits and apples for hospital use. All of the fruit raised on the farm and large quantities from the surrounding territory were

Gathered for a pruning demonstration.

packed in the experimental cannery. The shipments overseas included one hundred and forty tons of peaches, fifteen tons of plums, seven tons of apples and fifteen tons of strawberry, raspberry and black currant jam put up in about fifty thousand gallon cans.

All of this work was carried out in addition to the regular duties of the Fruit Branch and the Experiment Station, the funds being provided by the Province from a special vote for war purposes. Experiments and demonstrations in pruning, spraying and other orchard practices, packing schools, visits to advise orchardists on problems that require special treatment, work on bulletins and circulars. These lines of work took up the attention of the staff during the balance of the year.

The past season will long be remembered by fruit growers for the very adverse weather conditions experienced. The extremely wet spring followed by just as dry a summer made spraying and cultivation unusually difficult, particularly as this was aggravated by a decided shortage of labor. All growers suffered alike but the results were most unfortunate for the apple orchardists whose crop was not only seriously diminished by the wet at blossom time and a heavy June drop continued into July but by the worst attack of scab ever experienced in Ontario. As a result the markets both of the west and at home had to be supplied by fruit from other sources.

The Department in its own orchards was able to keep the fruit clean by careful and continued spraying. That it pays is proven by the figures given below:—

APPLES: RESULTS OF SPRAYING, 1916.

Variety.	No. of Sprays.	Per cent. clean.
Collingwood;		
Spy	3	96
"	4	96
"	5	96
Snow	3	95
"	4	96
"	5	96
Greening	3	96
"	4	98
"	5	98
McIntosh	6	90
Wellington (Orchard close to lake):		
Spy	6 dormant spray omitted	52
"	4	68
"	5	83
(Orchard ½ mile from lake)		
Cranberry	4	89
Ben Davis	5	92
4th Spray 2 weeks after blossom.		

Variety.	No. of Sprays.	Per cent. clean.
Whitby:		
Spy	5	80
Snow	5	84
Greening	5	90
Ribston	5	96
Thedford:		
Spy, young trees.	5	97
" large trees, well pruned.	5	85
" large trees, not as well pruned	5	77
Holland Pippin	5	90
Paris:		
Spy	3 low land	50
"	3 high land	89
"	4	95
"	5	96
Greening	5	97
Wagner	5	100
5th Spray one month later.		

In the five orchards under the care of this Branch were 1,307 bearing trees ranging from 16 to 40 years of age, about one-third Northern Spy, the balance a mixture of varieties usually found in Ontario orchards. The expenditures and receipts for the year show the following results:—

EXPENDITURE.		RECEIPTS.	
Pruning	$365 33	Box apples	$200 94
Spraying	790 72	Culls	723 21
Manure and cultivation	446 03		
Picking, packing and packages	2,789 96		
Rentals	1,442 00		
Receipts above expenditures	3,090 14		
	$8,924 15		$8,924 15

No allowance has been made in the above figures for management. On the other hand expert labor was employed and the rates of pay are higher than usually paid by the fruit-grower. The unusually high prices for good fruit certainly brought up the receipts to a high figure.

HORTICULTURAL EXPERIMENT STATION

PLANT BREEDING. The work the past season has been somewhat interrupted with military duty, but nevertheless considerable cross-pollination and propagation work has been accomplished. Large numbers of hybrid and seedling plants from the previous year's work have been secured and most of them transplanted to the field in a plantation with sufficient space to fruit. In spite of the extreme adverse weather conditions throughout the whole season, a large percentage made satisfactory progress by the fall.

The breeding work has altogether been confined to the fruits of commercial importance in the Niagara District and since its inception only one plantation

Vineland fruit farm, looking to the lake and showing the irrigation system.

of raspberries and one of strawberries have fruited. The results from these will serve as a guidance for future work in these fruits. Every plant in something over 8,000 of these strawberry and raspberry hybrids and seedlings has been carefully examined and described and 280 selections made in strawberries and 30 in the raspberries. All of these selections show indications of being equal or superior to our commercial varieties but they must be given a thorough test and their superiority proven beyond a doubt before any of them can be offered to the public. It is hoped that an improved strawberry will be introduced to the trade next year.

Much other work is under way and many young plants are all making as rapid and satisfactory growth as can be expected and no doubt will, in a few years' time, yield valuable material, both as to the yielding of information from a scientific viewpoint and as improved varieties.

Pomology. Several of the experiments being conducted under this Department are beginning to show very interesting results. Chief among these experiments might be mentioned that of summer pruned vs. winter pruned vs. unpruned apple trees. A complete report of this experiment was published in the Fruit Branch Circular for August, 1916.

A good start has been made in the work of identification and careful detailed description of the various fruits at the Station. Complete descriptions of the many varieties as to hardiness, yield and susceptibility to disease of the trees and of the quality, etc., of the fruit itself are made.

The outside work of the Station grows steadily. Many telephone calls, letters and personal visits are made by growers both near and far on questions pertaining to their particular lines of fruit growing. Members of the staff are called upon to make many visits during the season to growers scattered throughout the whole Niagara District.

Vegetables. Practically all the vegetable work is a continuation of variety testing and other experiments started in 1914 with new work added from time to time.

The variety testing experiments include eleven varieties of asparagus, thirty varieties of tomatoes with a total of some three hundred individual selections, nine varieties of potatoes with a large number of single hill selections, eleven varieties of garden peas with a large number of individual selections, and a few varieties each of corn, beets, onions, cabbage, cauliflower and celery. Seeds from all of these crops and selections are being saved for further work in the field.

Irrigation, cultivation and fertilizer tests are being conducted with good results on asparagus, potatoes, celery, onions, beets, carrots, lettuce, cabbage and cauliflowers.

A considerable quantity of vegetable seed is produced each year including the difficult biennials such as cabbage, cauliflower, celery, onions, carrots, beets and parsnips as well as the common annuals. A considerable quantity of onion and beet seed has been distributed to a number of vegetable growers in an experimental way. Very good success is reported for these seeds so far.

Other work includes a small crop of melons grown in frames early in the season with a few tomatoes or cucumbers grown at odd times in the greenhouse. Small crops of beans, peppers, radishes, egg plants and rhubarb are produced as well as other uncommon and new vegetables.

FOR HOSPITALS OVERSEAS

From June 29th until November 20th the canning factory at the Experiment Station operated continuously in the preparation of jams, jellies and canned fruits for the Canadian Military Hospitals overseas.

The jams and jellies were made chiefly from strawberry, raspberry, black currant, peach and apple and amounted to 7,022 gallon tins or 63,194 pounds net weight.

The most important item in the pack was the 32,562 gallons of peaches, canned in heavy syrup. This quantity represents 140 tons of choice peaches.

Other fruits of note were 4,037 gallon tins of apples, 3,949 of plums and 558 of pears.

The total pack consisted of 49,140 gallons. All of this material has been labelled. carefully secured in strong cases and forwarded to the military hospitals—a gift from the people of Ontario to wounded Canadians overseas.

Apart from the work of canning an investigation has been made into the maturing of grapes. The object was to find out definitely the changes in sugar and acid content of different varieties of grapes while developing on various types of soil. By continuing the investigation for another two years, seasonal variations will have been allowed for and we shall be in a position to tell the fruit-grower the minimum amount of sugar and the maximum of acid which a grape should have before it is fit to market.

Throughout the summer the leading varieties of strawberries, raspberries, plums and peaches were studied for their value in canning and jam-making. In connection with this work eight California varieties of clingstone peaches are being propagated. When these come into bearing they will be tested along with our own varieties.

INSPECTION WORK

1. Nurseries. Five inspectors, assisted from time to time by the Provincial Inspector, Mr. W. E. Biggar, were engaged during this summer in the inspection of nursery stock for San José Scale. The following is approximately the number of trees inspected:—

Apples, 1,500,000; pears, 150,000; plums, 100,000; cherries (sweet and sour), 150,000; peaches, 250,000. In addition to these there were several hundred thousand ornamental trees, currant and gooseberry plants and shrubs of various kinds.

In districts where San José Scale was known to exist all orchards within half a mile of each nursery were inspected during the winter and early spring and wherever scale was found the owners were notified of the fact, given definite instructions how to combat it successfully, and required to carry out these instructions. In consequence no complaints from nurserymen of the state of the surrounding orchards have reached this office.

2. Fumigation. All nursery stock from the scale infested districts was fumigated with hydrocyanic acid gas by our own inspectors before it was shipped out or distributed. In districts where no scale has been found either in the nurseries or surrounding orchards the nurseryman was allowed to do his own fumigation in accordance with written directions furnished him.

3. Orchards. Municipal inspectors throughout the various townships of the Niagara district with the exception of Niagara township, where the Council failed to appoint an inspector, examined the orchards in spring for San José Scale and Black Knot, and later peach orchards for Yellows and Little Peach. An effort was made this year to have the scale inspection completed as early as possible so that the inspectors might visit the orchards again during the spraying and point out any defects in the method of doing the work. In addition to the Niagara district there were inspectors appointed in Blenheim, Dunwich and Bosanquet townships, and also in the towns of Grimsby, Beamsville, St. Catharines, Thorold, Niagara-on-the-Lake, Niagara Falls, Seaforth and Walkerville. We are glad to report that Yellows and Little Peach remain well under control, very few trees being diseased in well inspected townships.

4. Local Infestations with San José Scale. From a few new localities specimens of San José Scale have been sent in for identification. In each instance the Provincial Inspector was sent to the locality and by advice and demonstration showed how the pest could be combatted. Very excellent results have followed from this method of prompt attention to each individual case and in consequence the spread of the scale has been slow.

APIARY INSPECTION, 1916

The diseases of the honey bee have been combatted this past season by apiary inspectors visiting the bee-keepers and inspecting the apiaries, and also by a series of apiary demonstrations conducted with a view to educating the bee-keeper to be his own inspector. The success of these methods varies considerably in different localities. There is no doubt that better bee-keeping follows in the wake of the inspector and the demonstrators, and that a disease is in many cases a blessing in disguise, while in other districts it is causing an enormous loss annually.

The demonstrations are often followed by the inspection work. Bee-keepers after attending the apiary demonstration know without further instruction how to carry out the treatment when the inspector pronounces the colonies to be diseased. The time spent conducting these demonstrations is more than repaid by the time saved in explaining the details of the treatment to a dozen or more bee-keepers at once, rather than to each one individually.

Studying Beekeeping.

Nearly twenty years ago, Foul Brood inspection was conducted with a view to eradicate the disease. After so many years of steady conscientious work the disease is still prevalent and is found scattered over a greater area. But the inspection work has not been a failure, even though it has failed to exterminate the disease. It has founded a better system of bee-keeping in Ontario and largely due to the efforts of the apiary inspectors, bee-keepers are enabled to engage extensively in the honey producing industry and produce as large, if not larger crops than previously.

The vote for the inspection work was apportioned to the different counties according to their needs. In this way it was hoped to do the most work where it was most needed. The extremely wet weather in the early part of the season seriously checked the work and the very heavy honey flow prevented rapid work,

as the inspectors had to remove many supers before they could get at the brood-chamber.

Those applying for special inspection were given first attention. The inspector was instructed to attend to these requests and while in their neighborhood do as much work as possible. In this way, the most urgent cases received attention and the careless indifferent bee-keeper did not take up the inspector's time unless he was a menace to his neighborhood.

Of the 652 apiaries visited, 215 were reported diseased, showing in the 6,718 colonies inspected that 19.8 per cent. were diseased. The inspectors burned over 9 per cent. of the colonies inspected.

DUSTING INSTEAD OF LIQUID SPRAYING

One of the most important and interesting matters to fruit growers during the past season has been the experimental work in the use of dust instead of liquid sprays. Tests in the application of chemicals in dry rather than liquid form have been made at Cornell, in New York State, over a period of four or five years. The results announced last year seemed to favor "dusting" as being equal in effectiveness and superior in point of saving time. Accordingly tests were made in this Province during the past season. Although one season's results are not considered absolutely conclusive, the results were very favorable as far as the work of the Provincial Entomologist was concerned. He reports as follows:—

Dust sprayer in orchard.

"A careful and somewhat extensive test was made on apples, plums, cherries, peaches and grapes of the new method of treating diseases and insects by dusting them with a mixture composed of 85% very finely ground sulphur and 15% arsenate of lead powder. Wherever, as in the case of grapes, an insecticide was not required the arsenate of lead was omitted. The dusting was done by means of a blower driven by a 2½ h.p. gasoline engine. For the sake of convenience all the work was carried on in the Niagara district. The result on a block of ninety-two very large and much neglected apple trees was that at the time of picking an average of 97% of the fruit was free from scab, and a little over 90% free from Codling moth. On a liquid sprayed plot in the same orchard where lime-sulphur and arsenate of lead paste were used, the result was an average of 99% of the fruit free from scab and about the same percentage free from Codling moth as in the dusted area. Untreated orchards of the same varieties of fruit

averaged from 40% to 50%, free from scab and from 30% to 60% free from worms. It is thus clear that under Niagara district weather conditions the dust method of treating orchards gave almost as good results as the liquid spray, both on apple scab and Codling moth, the two main orchard pests of the Province. The foliage on the dusted trees was more nearly perfect than that on the liquid sprayed trees. The dust spray required not more than one-eighth of the time to apply and, though a little trying on the eyes, was not nearly so unpleasant to use. It demanded, however, just as much intelligence and much more rapidity of movement on the part of the operator than the old method of spraying. On large apple trees the cost was less than that of the liquid sprayed, but on small trees was greater; the smaller the trees the larger the comparative cost.

"It would be unwise from our own results to come to the conclusion that the dust spray would be satisfactory under all conditions because reports from all other experimenters in the Province except one, show that they did not obtain nearly so good effects upon the apple scab with this new method as with the liquid spray. There is no doubt that wet weather washes off the dust spray much more quickly. It will, therefore, be necessary to suspend judgment before coming to a decision as to the use of the dust spray on apples. We should perhaps, mention here that a great drawback to the use of the dust is that up to the present time no really satisfactory substance has been tested that would completely control the San José and Oyster-shell Scales when applied with the dusting machine, and, therefore, we have still to rely upon the liquid spray for the first or dormant spray by which these pests are combatted.

"Upon cherries the dust gave as nearly as we could estimate the same results as the liquid lime-sulphur and as Bordeaux mixture, the trees sprayed with any of these being much freer from rot than the unsprayed trees.

"On Lombard plums, the only ones tested, good results were obtained in the control of the rot compared with the unsprayed check trees of the same variety.

"On peaches no conclusion could be drawn as to the value of the dust as a controller of brown rot, because this disease was almost totally absent even on unsprayed trees.

"On grapes it controlled almost complete powdery mildew, both on the foliage and fruit, though several applications were necessary to effect this result. Unsprayed vines showed a considerable number of infested fruits and leaves. The effect on black rot of grapes could not be determined because there was almost none of this disease this year in any vineyard visited."

CO-OPERATION AND MARKETS BRANCH

Through the Branch a good deal of detail work has been carried on in assisting to organize and incorporate co-operative organizations of producers and in conferring with and advising established co-operative associations. No attempt has been made to force an unnatural growth of these organizations but the endeavor is made by responding to applications for assistance to see that they are soundly organized and economically managed.

It is difficult under the present circumstances, to obtain actual figures, but there are in Ontario approximately the following business organizations of farmers:—

52 Fruit Growers' Associations.
35 Egg Circles.
11 Vegetable Growers' Associations.
1 Honey Producers' Association.
31 Seed Centres.
18 Live Stock Breeders' Associations.
3 Corn Growers' Associations.
5 Potato Growers' Associations.
2 Onion Growers' Associations.
1 Tobacco Growers' Association.
1 Bean Growers' Association.

and an undetermined number of co-operative creameries, cheese factories, milk producers' associations, farmers' clubs, etc., as well as a number of miscellaneous organizations handling a variety of products. The above are all in business in an organized way and the list does not include numerous organizations of an educational nature which are nevertheless doing more or less co-operative buying and selling.

It is important that co-operative marketing associations establish grades of the produce they are selling in order that members may be justly paid for produce delivered and the production of quality be encouraged. Few farm products are legally standardized and until they are so standardized the association must establish grades for itself. Information is being collected to assist in defining grades of various products, so that they may at least be uniform for the Province.

Another important matter in connection with co-operative associations is that of book-keeping and we find this to be a great weakness. Information is being collected as to suitable systems for the different lines of trade, and our investigation of the affairs of a number of associations clearly indicate the need of extended information and assistance to practically all co-operative associations in this connection.

An increasing number of co-operative associations are seeing the advantages of incorporation. These are incorporated under The Ontario Companies Act, and direction and assistance has been given in this direction to the organizations concerned.

There are in the Province some 300 Farmers' Clubs and though organized mainly for educational purposes, they are the natural breeding ground for co-operative enterprises. Many of these Clubs have made a start in co-operative trading, both in buying and selling. Their experience has created a desire for a more efficient organization of the Clubs for these purposes, and from such Clubs there is being organized a number of important co-operative trading organizations. In the main, Farmers' Clubs are now co-operating in the buying of supplies; increasing numbers are, however, carrying on co-operative marketing. In almost all cases when Clubs have become incorporated they have entered upon the business of marketing some farm product, or products. As an illustration of the tendency

of these Farmers' Clubs, Lambton County might be cited. In the County there are some 40 Clubs, each in the past carrying on its buying of supplies independently. During the year a federation of these Clubs has been effected and incorporated. This Central organization for the County will mobilize the buying for the individual Clubs and will undertake the marketing of live stock, to be followed as occasion warrants by the marketing of other commodities. One or two other counties are following in the direction of Lambton in this regard.

During the year the Branch circulars listing farm products wanted or for sale by Farmers' Clubs have continued and circulated to all organizations.

Seventy-one Farmers' Clubs have reported purchases to the amount of $225,268, an average of $3,173.

Twelve Farmers' Clubs report sales of farm products of $178,624, an average of $14,885 per Club.

During the year a large number of the Fruit Associations has been visited, and much information as to their methods obtained. In visiting the associations this information has been disseminated in a personal and effective way. Particular enquiries were made as to the methods of book-keeping and a suitable set of books is now being tried out which it is hoped will make the business of the associations much more satisfactory.

The work of systematizing the marketing of tender fruits of Niagara Peninsula has been continued. The working out of a system where it can be put into active operation has not yet been completed but progress has been made.

The Branch offered to assist Fruit Associations in making an audit of their books. A number of associations responded and these were visited and suggestions made as to improving the system of records to suit the particular business of the associations.

Twenty-three Fruit Associations report sales of $448,775, an average of $19,251.

Nineteen Associations report supplies bought to the amount of $60,478, an average of $3,183.

There are in the Province some 35 or 40 active co-operative Egg Circles.

Fourteen of these report sales of $111,035, an average of $7,931. Practically all the work of Circles is in the sale of eggs, three Circles only, reporting supplies bought of $536.

So far no co-operative associations have been incorporated for the express purpose of marketing live stock. A number of associations are, however, shipping stock co-operatively in conjunction with other activities.

A few Farmers' Clubs have united the shipments of its members regularly, reports coming back of Clubs selling $10,000, $14,000, and as high as $100,000 worth of live stock annually, and marketing associations in New Ontario and Manitoulin Island sell considerable quantities of cattle, hogs, lambs, etc. This work is being investigated to gather information upon which to organize Live Stock Shipping Associations.

The farmers of Pelee Island, because of their peculiar situation, have been at a disadvantage as regards the marketing of the products of the Island. During the year the Branch assisted in organizing the Pelee Island Co-operative Marketing Association, which has already materially benefited the Island, especially in the marketing of their wheat and hogs.

Under the Canadian Seed Growers' Association a number of Seed Centres for the production and sale of pedigreed seed has been formed. Only some half

dozen of the 30 or more Centres have as yet seed for sale. There are, however, a small number of organizations which are not Seed Centres but are producing and selling seeds co-operatively, one association selling $80,000 worth and another $13,000.

In the Province are a number of special crop districts, where the marketing of the crop has not received the attention which production has. An instance is the onions of Leamington District, and the Branch is at present assisting the growers in forming an organization for more efficient marketing of onions.

The Tomato and Fruit-growers of Leamington are now partly organized with two or three companies doing practically the same work in the same territory. The Branch is assisting these to come together and carry on the work through one company with a consequent lessening of the cost of marketing.

The above are cited as illustrations of the activities of the Branch. Numerous co-operative organizations have been visited during the year; most of the assistance given being in the matter of organization. In this way much detail information has been collected and made available for districts desiring to be organized. Lists of wholesale firms and manufacturers have been prepared and sent to co-operative associations desiring the same. As complete a list as possible of all organizations in the Province is maintained and is available to members of the various trades, in farm products and supplies, who desire to be put in touch with these organizations. Each year sees some advance in systematizing and organizing of the marketing of farm products in the Province, and the aim of the Branch is to encourage and assist these organizations to become economic and permanent factors of the trade.

DISTRICT REPRESENTATIVES

During the year 1916 the work of the Department of Agriculture conducted in the various counties by the District Representatives has on the whole been most encouraging in spite of difficulties met with in securing competent help. There has been only one new office opened, viz., at Monteith, in northern Temiskaming, making in all 45 offices throughout the Province. The County of Lincoln fulfilled the necessary conditions entitling them to a District Representative office, but owing to the scarcity of experienced men, the Department was unable to grant the request at present. It has been the practice prior to the war to employ undergraduates of the Ontario Agricultural College as assistants to the District Representatives; in 1915, this form of assistance was continued for the summer months only. This year, it was found advisable to dispense with assistants altogether, with the exception of a few of the larger counties. While this proved a rather serious handicap to the work, I am glad to report that with the assistance of temporary local help all lines of work were continued and in some cases considerably increased. Agricultural production is no doubt most important at the present time and the District Representative is an important factor in this work. However, many of the men have felt that they could serve their country better by donning the khaki and I am proud to state that 25 young men have gone overseas with the Canadian forces. Our Honor Roll at the present time is as follows:—

Winners of the cup in stock judging at the school fair.

HONOR ROLL.

L. H. Bertram.
W. E. Hare.
C. A. Tregillus.
J. E. Lattimer (prisoner).
C. C. Main.
M. T. Smith (killed).
S. Waterman.
R. Austin.
Geo. Wilson.
D. R. Irvine.
G. A. Elliott.
W. G. Magee.
P. S. D. Harding.
E. R. Hall.
J. A. Carroll.
H. R. Hare.
H. M. McElroy.
C. Graham.
R. L. Vining.
J. L. Foote.
P. C. Connon.
F. C. Donald.
R. B. Hinman.
L. P. Clemens.
R. S. Beckett.

MEETINGS IN OFFICE.

Month.	Cheese Board.	'Agri-cultural Society.	Horti-cultural Society.	Ban. Oats Associa-tion.	Horse Breeders' Associa-tion.	Ayrshire Breeders' Associa-tion.	Women's Ins.	Red Cross.
November	3	1	1	.....	.....	.....	1	3
December	.....	.....	.....	.....	.....	.....	1	2
January	.....	1	.....	1	1	.....	1	1
February	.....	.....	1	1	.....	.....	1	3
March	.....	2	1	.....	1	1	1	.....
April	2	1	1	1	1	.....	1	1
May	5	.....	.....	.....	.....	.....	1	1
June	4	.....	.....	.....	.....	.....	2	.....
July	4	1	.....	.....	1	.....	1	.....
August	5	1	1	.....	.....	.....	1	2
September	4	2	.....	1	.....	.....	.....	2
October	4	.....	.....	.....	.....	.....	1	2
Totals	31	9	5	4	4	1	12	17

It is encouraging to note the increased interest on the part of the farmer in District Representative work, as evidenced by the use made of the District Representative's office each year. The following statement received from one of the offices will serve as an illustration: (See Hastings County report on office work, page 2.)

District Representatives are encouraged to write articles for the local papers on various agricultural subjects at timely intervals throughout the year. These are usually quite brief and deal with questions of special interest to the farmers in that locality. In this way the District Representative has been able to come in contact with many farmers who could not be reached in any other way. The following is a list of articles prepared by one District Representative for the papers of his county:

"Power Machinery on the Farm Home."
"Planning the Spring Work and the New Crop."
"Rearing and Housing Chickens."
"Results of Corn Variety Test."
"Seasonable Hints for December."
"Results of Junior Farmers' Competition."
"Short Courses in Stock Judging."
"Results of Demonstration Orchards."
"Stock Judging Team at Guelph."
"Winter Management of Hogs."
"Pruning Trees."
"Treating Grain for Smut."
"Preparedness for Spring Work on the Farm."
"Standing Field Crop Competitions."
"School Fairs in 1916."
"Retired Farmers for Farm Work."
"A Call to Men and Boys to Help on the Farm."
"The Backyard Garden."
"Testing Seed Corn."
"Select Your Seed Potatoes Carefully."
"Management of Chicks."
"Tent Caterpillars."
"Black Leg in Cattle."
"Pests of Roses: Getting Rid of Red Ants."
"Agricultural College Excursion."
"Potato Blight and How to Prevent it."
"Crop Prospects for Peel County."
"Home Garden Contest."
"Courses in Agriculture."

SCHOOL FAIRS

The School Fair movement which is being conducted by the District Representatives throughout the Province continues to receive the hearty approval and support of children and parents alike. This has been proven decisively by the results of the past season, when in spite of unfavorable weather conditions, the Fairs, both in interest and number, surpassed all previous records. The following table gives a comparison with the records for 1915:

	1915.	1916.
Number of fairs held	234	275
Number of schools included	2,291	2,620
Number of children taking part	48,386	60,262
Attendance of children at fairs	72,860	83,029
Attendance of adults at fairs	84,406	95,217
Total attendance	157,266	178,246
Number of entries	116,236	113,263
Number of home plots	51,243	55,947

Shield given to the school winning highest number of points in district.

When the School Fair movement was first inaugurated quite a number of people felt that it would interfere with the success of the township and county fairs. It is true that the attendance at school fairs in some sections is in excess of that at the township fair. However, the Department has always maintained that the School Fair would eventually prove the salvation of many small agricultural societies. This is being demonstrated in several sections of the Province in that the children, as a result of the inspiration and training of the School Fairs, are becoming exhibitors at many of the Township and County Fairs. The following extract from one of our District Representative's reports will serve to illustrate this point:

"Tom Simpson, who won $5 in prizes at the Wardsville School Fair was so encouraged by his success that he exhibited at the local fall fair and carried off $11 in prizes. We also heard from other parts of the County of children who had been successful at school fairs and had been induced to exhibit at local fairs. One pupil who received first on his mangels at the school fair, also won first at the local township fair. Another boy, after winning at his school fair, exhibited at two township fairs. The following is a list of material he exhibited and the prizes won:—

.....Fall Fair—	1st	on Watermelon.
	2nd	" Garden Squash.
	1st	" Globe Beets.
	2nd	" Salsify.
	3rd	" Pears.
	1st	" Barred Rock Chickens.
	2nd	" White Leghorn Chickens.
	3rd	" Tomatoes.
.....Fall Fair—	1st	" Pears.
	2nd	" Beets.
	1st	" Pie Pumpkin.
	2nd	" Watermelon.
	1st	" White Leghorn Chickens.

Many of the more progressive township and county fairs fully appreciate the importance of encouraging the children to exhibit, and not only permit the children to enter the regular classes but also have a special list of prizes open only to children taking part in school fair work.

SEED FOR SCHOOL FAIRS

It has been the practice from the beginning to supply the children with seed. In this way the District Representative is enabled to introduce seed of good quality and of desirable varieties. This not only serves as a demonstration but we find that the seed used by farmers in many cases originated from the seed supplied to the children by the Department. We also find that the children in many instances save the seed from their home-grown plots for use the next season. In one county a record was kept of all the children receiving seed the previous year. It was found that 33 per cent. of the children planted their seed from 1915, in 1916; 60 per cent. their barley, 25 per cent. their early potatoes and 22 per cent. their late potatoes. The following is an outline of a plan adopted by a District Representative for the purpose of securing high-class potato seed for school fair distribution: Four bushels of registered Green Mountain potato seed was purchased from a member of the Canadian Seed Growers' Association last spring. From these four bushels three bushels of seed free from scab and other signs of disease were selected. The seed was soaked in formalin for two hours and planted on well prepared ground that had not grown potatoes for some years. This seed plot was kept sprayed throughout the season and served as a demonstration plot in controlling blight, the tops remaining green until frost came. At digging time they gave a splendid yield, which is all the more remarkable considering the fact that all the other potatoes in the same district were practically a failure. The seed is clean, free from disease, and is very desirable for distribution among children connected with school fair work. In order to still further improve the strain careful hill selection was made to be used for seed for a similar plot next year. The Department has instructed all District Representatives to adopt this method in order that they may be independent of outside sources for a supply of good seed.

A school fair director—one of the bright boys who help to make the fairs a success.

SEED AND EGGS PURCHASED FOR SCHOOL FAIR WORK

Previous to this year it has been the practice to have the District Representative purchase all the seed required for School Fair work. This plan, however, was not economical, and the Department has adopted the plan of calling for tenders for all the seed required by all the offices. The following is a complete list showing the variety and quantities purchased for last year:

SEED AND EGGS PURCHASED FOR SCHOOL FAIR WORK, 1916.

Barley	O. A. C. 21	74 bus.
Oats	O. A. C. No. 72	170 bus.
	O. A. C. No. 3	
	Banner	
Wheat	Marquis	25 bus.
Sweet Corn	Golden Bantam	7 bus on cob.
		16 bus. shelled.
Field Corn	Wisconsin No. 7	61 bus. on cob
	North Dakota	
	Golden Glow	
	Longfellow	
	Compton's Early	
	White Cap Yellow Dent	
	Bailey	
Field Peas	Arthur	4 bus.
	Prince Albert	
	Early Britain	
Potatoes	Delaware	1,147 bus.
	Davies' Warrior	
	Empire State	
	Canadian Standard	
	Green Mountain	
	Early Eureka	
	Irish Cobbler	
Turnips	Carter's Invicta	3,484 packages.
	Garton's Model	
	Purple Top Swede	
	Good Luck	
	Garton's Keepwell	
	Hartley Rouge Top	
	Kangaroo Swede	
Mangels	Yellow Leviathan	8,103 packages
	Yellow Intermediate	
	Bruce's Giant	
	Our Ideal	
	Mammoth Long Red	
Beets	Detroit Dark Red	2,822 packages.
Carrots	Chantenay	3,951 packages.
Onions	Yellow Globe Danver	2,429 packages.
Parsnips	Hollow Crown	485 packages.
Asters	Giant Comet (mixed colors)	10,711 packages.
Sweet Peas	Giant Spencer Hybrid (mixed colors)	4,819 packages.
Pansies	Giant Trimardean (mixed colors)	680 packages.
Cosmos	Early Flowering (mixed)	350 packages.
Phlox	Drummondi (mixed)	1,395 packages.
Nasturtium	California Giant (mixed)	340 packages.
Petunia	Large Flowering (mixed)	250 packages.
Eggs	Barred Rocks	8,058 dozen.
	White Wyandottes	
	Rhode Island Reds	

How they get to the school fair sometimes.

A school fair crowd.

NEW FEATURES IN SCHOOL FAIRS

The general management of School Fairs has been much the same as in former years, but as might be expected, new features are being introduced from time to time. Among these might be mentioned, "Inter-school Live Stock Judging Competitions," "Weed Naming Contests," "Driving Contests," etc. Public speaking contests are now recognized as an important feature of a School Fair. There seems to be no difficulty in getting the children to enter this contest, and generally speaking, they acquit themselves well. The following is typical of the average speech at a School Fair:

BENEFITS DERIVED FROM SCHOOL FAIRS

LADIES AND GENTLEMEN:—As every boy or girl is allowed to try the Public Speaking Contest I have taken for my subject "The Benefits Derived from the School Fairs." In the first place, it is a benefit from a social standpoint. The fathers and mothers can meet together and have a sociable time, and talk over the times when they were boys and

The public speaking contest at the school fair.

girls, and compare the chances the boys and girls of to-day have with the chances they had. And how proud a father and mother must feel to drive home with a boy or girl who has won a prize. Then the boys and girls from different sections meet and get acquainted. The one sees the result of the other's effort; and by so doing is encouraged to put forth a greater effort the next year.

Then, there is the spirit of contest. Every boy (and I guess every girl, too) loves to be in a contest. It develops courage and ambition. No boy likes to be beaten, so in order to win he does his very best. And by cultivating this spirit he may develop into a man who will stand in the first ranks.

There is another encouraging feature about this fair and that is the Government gives the best of material to work with. We get the best kind of seed grain, the best vegetables and roots. We also get eggs for setting and as a result many a farmyard contains a better class of fowl.

Then, there is the mechanical part of this fair, boys are encouraged to make many useful articles.

Before when we wanted a milk stool or chicken coop made we used to ask dad to make it for us. But now we make it ourselves, and dad can spend his time reading the war news.

Now, surely with all these helps and encouragements, we boys will grow up into men who will stay on the farm and help to make farming a grand success.

I thank you, ladies and gentlemen, for your kind attention.

The conducting of sports in connection with the School Fair adds much to its success. However, one difficulty experienced in conducting sports is that there are too many entries in each class causing more or less confusion. In a number of counties, during the past year, this difficulty was overcome by having each school teacher conduct a preliminary meet prior to the School Fair, and only the winning pupils in each event were entered in the School Fair sports.

FINANCING SCHOOL FAIRS

All the expenses in connection with School Fairs are financed by the Department of Agriculture with the exception of the money used for prizes. The amount required for prizes varies from $80.00 to $125.00 at each Fair. This money is

One corner in the school fair tent.

secured by grants from the School Boards, County or Township Councils and private individuals. Each School Fair's business is kept distinct from the others and the children who are officers of this association have their own bank account and submit a financial statement to the members of their Society each year. The following is a typical financial statement of a School Fair:

FINANCIAL STATEMENT OF SCHOOL FAIR FUND FOR DEREHAM TOWNSHIP

Money Received.		*Expenditures.*	
Donations from School Boards..	$72 25	Money prizes at School Fair ...	$100 45
Money for 32 doz. eggs at 25c...	8 00	Postage for cheques, etc.	33
Donation from Township Council	50 00	Engraving cup for stock judging prize	1 39
Donation from Mr. Chas. Pearce	5 00	Books for stock judging prize..	4 95
Total	$135 25	Total	$107 12
		Balance in bank	$28 13

(Signed) DAISY STOAKLEY,
Sec.-Treas., S. F. A.

November 4th, 1916.

PATRIOTIC FUND

Selling pins at school fairs to get money to help the soldiers.

In my report for 1915 I told of the splendid patriotic work done by the rural school children connected with the School Fair movement which resulted in raising $1,843.18 from potato war plots. This money was used to purchase an ambulance which was donated to the Red Cross Society, and from reports received is rendering great service in France. This year the Department purchased 100,000 specially designed patriotic buttons and arranged to have a tag day in connection with each School Fair. As was expected the children entered wholeheartedly into this patriotic work and succeeded in selling a large proportion of these buttons. They also conducted, in many instances, refreshment booths, the proceeds of which went to patriotic purposes. After paying for the buttons and a few other incidental expenses, the children have to their credit the handsome sum of $2,689.27. This money will be used to purchase another ambulance for the Red Cross, or something equally useful.

COURSES IN AGRICULTURE

With each year comes an added interest and appreciation of the value of Courses in Agriculture conducted by District Representatives for farmers' sons. The nature of these Courses has been so fully outlined in my previous report that

Boys attending a four weeks' Agricultural course.

it is unnecessary to outline them in detail at this time, except to say that they are made as practical as possible and are made to suit the class of agriculture practised in the district where the Course is held. Courses were conducted in 36 counties with a total attendance of 888. This is a slight falling off as compared with the previous year, but is an exceptionally good showing in view of the large number of young men enlisting for overseas, and the present great scarcity of farm help. The following is a weekly time-table prepared by one of the District Representatives, which is fairly typical of that generally adopted by District Representatives:

TIME TABLE.

Time.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
9.00–9.50 A.M.		Live stock.	Manures and fertilizers.	Weeds and insects.	Fruit growing.
9.50–10.30 A.M.		Soils.	Field crops.	Soils.	Field crops.
10.40–11.20 A.M.	Feeds and feeding.	Poultry.	Underdrainage.	Live stock.	Bees and veterinary science.
11.20–12.00 A.M.	Dairying.	Fungus pests.	Farm book-keeping.	Feeds and feeding.	Bacteriology.
1.30–2.45 P.M.	Grain judging.	Stock judging.	Milk testing.	Packing apples, and markets and co-operation.	Special lectures.
2.45–4.00 P.M.	Weeds.	Stock judging.	Grain judging.	Literary work.	Special lectures.

ACRE PROFIT COMPETITIONS

The Acre Profit Competition continues to be the most popular competition conducted by District Representatives. As in former years these competitions are open to farmers' sons who have taken a four to six weeks' course in agriculture. Those eligible for this competition decide upon the crop to be grown. Where sufficient entries can be secured two competitions may be conducted in one county. During the past year there were 53 acre profit competitions conducted throughout the Province representing in all 242 competitors. In connection with this ten different crops were selected as follows:

16	competitors in	oats.
9	"	corn for silage.
8	"	potatoes.
7	"	turnips.
6	"	mangels.
2	"	barley.
2	"	corn for seed.
1	"	wheat.
1	"	beans.
1	"	peas.

10 in all.

The winners in this competition were given a two weeks' course in Live Stock and Seed Judging at the Ontario Agricultural College in Guelph, all expenses (including travelling expenses, board and lodging, etc.) being paid by the Department of Agriculture.

The following is a list of winners, showing the yield per acre, cost of production and net profit:

OATS

(50c. per bushel).

County.	Winner.	Yield.		Cost Prod.	Profit.
		bush.	lbs.	$ c.	$ c.
Haldimand.....	Russell Warner, R.R. No. 4, Cayuga ..... Clay loam, following buckwheat, farmed 100 years, formaldehyde, O.A.C. No. 72.	60		13 57	16 43
Hastings.	Geo. R. Hill, Madoc ..... Loam, following timothy, farmed 20 years, formaldehyde, Banner.	58		13 07	15 93
Simcoe	Willson Bell, R.R. No. 3, Coldwater..... Clay, following potatoes farmed 40 years, formaldehyde, O.A.C. No. 72.	64	24	17 42	14 93
Algoma.....	G. W. Evoy, Bar River..... Clay, following timothy, farmed 6 years, Dalmeny.	54	22	13 35	13 97
York	John A. Orr, Maple ..... Clay, loam, following turnips and mangels, formaldehyde, Thousand Dollar.	59	13	15 98	13 72
Dundas and West Stormont ...	J. L. Tait, Northfield Station ..... Light loam, following corn, formaldehyde, O.A.C. No. 72.	55	13	14 15	13 54
Lennox and Addington ..	Blake Switzer, Wilton..... Clay loam, following oats, farmed 100 years, formaldehyde, O.A.C. No. 72.	54	17	14 20	13 05
Lennox and Addington ..	Clifford Abbott, Marysville, R.R. No. 1..... Loam, following corn, farmed 50 years, formaldehyde, O.A.C. No. 72.	59		17 07	12 43
Wentworth	Richard A. Quance, Hannon, R.R. No. 1..... Clay, following potatoes, farmed 50 years. O.A.C. No. 72.	57	13	16 71	11 98
Frontenac	Percival Henderson, Harrowsmith..... Loam, following potatoes, farmed 65 years formaldehyde, O.A.C. No. 72.	52		14 60	11 40
Welland	Thomas W. Hicks, Allenburgh ..... Loam, following oats, farmed 23 years, Siberian.	46		12 22	10 78
Victoria	Joseph Staples, Bobcaygeon..... Clay loam, following fall wheat, farmed 46 years. White Wave.	43		12 17	9 33
Middlesex	Allan McLean, R.R. No. 2, Strathroy..... Sand, following potatoes, formaldehyde, O.A.C. No. 72.	51		16 64	8 86
Peel	T. R. Maxwell, R.R. No. 1, Streetsville..... Clay, following alsike clover, farmed 100 years, formaldehyde, O.A.C. No. 72.	43		12 75	8 75
Grenville	Geo. E. Wiggins, R.R. No. 4, Kemptville..... Clay loam, following corn, farmed 60 years, O.A.C. No. 72.	36	30	11 64	6 81
Norfolk.....	Arch, Leedham, St. Williams, R.R. No. 1 ..... Sandy, following corn, farmed 30 years, formaldehyde, O.A.C. No. 72.	44		16 15	5 85
Glengarry	Stanley Wightman, Lancaster ..... Gravelly soil, following potatoes and corn, O.A.C. No. 72.	40	8	15 96	4 16

POTATOES

($1.00 per bus.)

County.	Winner	Yield.	Cost Prod.	Profit.
		bush. lbs.	$ c.	$ c.
Middlesex	William S. Courtis, R.R. 2, Mt. Brydges. Sandy loam, following wheat, farmed 50 years, 12 loads manure, Paris green, Dooley.	320	44 67	275 33
Sudbury	Napoleon Chenier, Hamner. Sandy loam, following pasture, farmed 3 years, 5 loads manure, Early Rose	295	38 55	256 45
Renfrew	Arthur Griese, Beachburg. Loam, following wheat, farmed 40 years, 8 loads manure, variety unknown.	288	41 25	246 75
Rainy River	Herbert C. Nixon, Emo. Clay loam, following wheat, farmed 25 years, 40 loads manure, Delaware.	300	63 08	236 92
Algoma	John Wm. Simpson, Sault Ste. Marie. Sandy loam, following cabbage, farmed 3 years, Carmen, No. 1.	285	48 10	236 90
Temiskaming	Leonard Nickle, Hanbury. Clay loam, following potatoes and wheat, farmed 3 years, 4 loads manure, Paris green, Delaware.	208	63 14	144 86
Grenville	Chas. L. Ferguson, R.R. 3, Spencerville. Sand and muck, following hay, farmed 25 years, 12 loads manure, Paris green, Green Mountain.	161	47 55	113 45
Northumberland.	J. Arthur Down, R.R. I, Hilton. Clay loam, following hay, farmed 70 years, 10 loads manure, arsenate of lead, Paris green, Carmen No. 1.	70	53 87	16 15

TURNIPS

(14c. per bush.)

		bush. lbs.	$ c.	$ c.
Muskoka and Parry Sound	Henry Oldfield, Powassan. Clay loam, following peas, farmed several years, 5 loads manure, Purple Top Swede.	1,173 20	26 36	137 90
Thunder Bay (Port Arthur)	Joseph Hughes, Murillo. Clay loam, following potatoes, farmed 25 years, 10 loads manure, Prize Winner.	1,092	37 00	115 88
Thunder Bay (Fort William)	William H. Trewin, Slate River. Clay loam, following potatoes, farmed 11 years, Elephant Swede.	880	22 15	101 05
Brant	Cuthbert Howell, R.R 1, St. George. Limestone soil, following oats, farmed 75 years, 15 loads manure, 250 lbs. salt, New Century.	885 40	31 30	92 69
Thunder Bay (Port Arthur)	Alfred Felker, Murillo. Gravelly loam, following fodder corn, farmed 5 years, 10 loads manure, Purple Top Swede.	840	36 50	81 10
Lanark	John M. Chapman, R.R. 3, Carleton Place. Clay loam, following potatoes and mangels, farmed 40 years, 14 loads manure, Jumbo.	648	35 73	54 99
Durham	Leonard McNeil, R.R. 1, Frazerville. Loam, following timothy, farmed 75 years, 18 loads manure, Jumbo Swede.	509	23 03	48 23
Renfrew	John R. Lindsay, Glasgow station. Clay loam, following pasture, farmed 16 years, 200 lbs. basic slag, Swede.	408	21 31	35 81

MANGELS.

14c. per bushel.

County.	Winner.	Yield.	Cost Prod.	Profit.
		bush. lbs.	$ c.	$ c.
Grey	James Moffatt, Bognor Clay loam, following potatoes, farmed 55 years. 8 loads manure, Giant Sugar Mangel.	1,112	22 65	133 03
Manitoulin	Harold Letts, Barrie Island Sandy loam, following potatoes, farmed 30 years. Royal Giant Sugar Mangel.	990 40	20 95	117 74
Bruce	Gilbert Marshall, R.R. 2, Teeswater Clay loam, following clover hay, farmed 40 years, Yellow Leviathan.	830	33 55	82 65
Halton	W. R. Hume, R.R. 6, Milton Loam following corn, farmed 2 years, Jumbo Sugar Beet.	560	16 70	61 70
Peterborough	Fred. M. Crowe, R.R. 4, Lakefield Clay loam, following clover hay, farmed 75 years, 14 loads manure, Long Red and Yellow Sludstroff.	525 30	29 33	44 24
Waterloo	Daniel Lerch, R.R, 2, Preston Clay loam, following oats, farmed 40 years, 12 loads manure, Leviathan.	367	27 47	23 90

CORN FOR SILAGE

($3.25 per ton)

		tons. lbs.	$ c.	$ c.
Simcoe	Wesley B. Tudhope, R.R. 1, Hawkestone Sandy loam, following millet, farmed 50 years, 8 loads manure, Eureka.	29 3/5	17 97	78 23
Halton	Wilbert Ford, R.R. 4 Milton Clay loam, following alsike clover, farmed 100 years, 1½ loads manure, Big Crop.	22 880	12 05	62 51
Grey	Albert E. Buchanan R.R. 2, Flesherton Clay loam, following Fall wheat, farmed 50 years, 18 loads manure Wisconsin No. 7.	24	22 05	55 95
Ontario	Wilbur Baird, Seagrave, R.R. 1 Clay loam, following mixed grain, 8 loads manure, Wisconsin No. 7.	20.08	16 53	48 73
Peterborough	Allen Taylor, Warsaw Sandy loam, following clover hay, farmed 75 years, 6 loads manure. Big Crop and Wisconsin.	18 3/20	14 60	44 39
Lambton	Leslie Griffin, R.R. 1, Sarnia Clay loam, following pasture, farmed 45 years, Loaming.	14 140	11 30	34 43
Oxford	H. E. Hall, Tillsonburg, R.R. 3 Sandy loam, following pasture, farmed 70 years, 4 loads manure, Wisconsin No. 7.	13 1,880	12 99	32 31
Bruce	Gladstone Tolton, R.R. 3, Walkerton Clay loam, following peas, farmed 45 years. 10 loads manure, Loaming.	14.47	18 66	28 36
Peel	James A. Harper, Bolton Clay loam, following oats, farmed 50 years, 15 loads manure, Loaming.	9 3/5	19 73	11 47

SEED CORN

($1.50 per bus)

County.	Winner.	Yield. bush.	lbs.	Cost Prod. $ c.	Profit. $ c.
Kent	Geo. Verne Robinson, R.R. 3, Dresden. Sand and clay, following hay, farmed 50 years, 6 loads manure, White Cap Dent.	62.89		20 13	74 20
Lambton	Benner Porter, R.R. 1, Forest. Clay loam, following barley, farmed 15 years, Wisconsin No. 7.	37⅔		18 60	37 80

BARLEY

(80c. per bush.)

		bush.	lbs.	$ c.	$ c.
Kenora	Stanley R. Browning, Oxdrift. Clay, following potatoes, farmed 16 years, O. A. C. No. 21.	50		15 48	24 52
Kenora	Donald F. McKenzie, Eagle River. Cl y, following turnips, farmed 9 years O. A. C. No. 21.	39	17	13 87	17 63
Dundas and West Stormont	Geo. B. Baker, Newington, R. R. 1. Clay loam, following meadow, farmed 75 years, O. A. C. No. 21.	23	19	11 92	6 80

BEANS

($3.50 per bush.)

		bush.	lbs.	$ c.	$ c.
Kent	Robert J. MacDonald, R.R. 3, Ridgetown. Black loam, following hay, farmed 70 years, Yellow Eye.	12⅓		14 74	28 42

WHEAT

($1.30 per bush.)

		bush.	lbs.	$ c.	$ c.
Lanark	Hugh M. Bowland, Clayton. Clay loam, following corn, farmed 65 years, Colorado.	29		16 08	21 62

PEAS

($2.25 per bush.)

		bush.	lbs.	$ c.	$ c.
Muskoka and Parry Sound	Ernest Norris. Following hay, farmed 13 years, Canadian Beauty.	15	6	19 94	14 04

FEEDING HOGS FOR PROFIT COMPETITION

This competition has proven very popular, particularly in the sections where dairying is an important industry. It has not only demonstrated the profitable side of this industry, but it has also impressed the young men taking part in the competition with the importance of greater care and attention to the feeding of swine. During the past year a competition was conducted in 26 counties, and 141 farmers' sons took part in the contest. The following statement gives the name of the winner in each contest, breed of hogs used, the average cost of production, average value and the average profit per hog:

In the feeding hogs for profit contest.

WINNERS IN FEEDING HOGS FOR PROFIT COMPETITIONS, 1916

(Hogs were valued at 11 cents per pound live weight)

County.	Winner.	Breed.	Average cost production.	Average Value.	Average Profit.
			$ c.	$ c.	$ c.
Lennox & Addington	Clarence G. Taylor, Odessa	Yorkshire, and Tamworth	11 11	27 48	16 37
Durham	Herman F. Hooey, Nestleton Sta.	Berkshire and Tamworth Cross	9 28	25 51	16 23
Lanark	Sedley Steen, R.R. No. 2, Packenham	Chester White	12 92	28 44	15 52
Victoria	Carl Brokenshire, R.R. No. 1, Fenelon Falls	Yorkshire and Tamworth	9 83	25 07	15 24
Ontario	Frank Johnston, Manchester	Yorkshire	13 28	28 44	15 16
Haldimand	Cecil G. Ricker, R.R. No. 1, Attercliffe	Yorkshire and Chester White	11 13	25 76	14 63
Grenville	Harry M. Lee, Kemptville	Tamworth	9 06	23 46	14 40
Lennox & Addington	Charles E. Burt, R.R. No. 1, Napanee	Yorkshire	11 35	25 62	14 27
Grey	Earl Davis, R.R. No. 1, Markdale	Yorkshire and Berkshire Cross	10 21	24 38	14 17
Prince Edward	Harold W. Minaker, R.R. No. 4, Picton	Chester and Berkshire	9 81	23 88	14 07
Frontenac	Joe. H. Watson, Harrowsmith	Yorkshire	10 32	24 26	13 94
Middlesex	Earl Robinson, R.R. No. 3, Strathroy	Yorkshire	9 60	23 00	13 40
Sudbury	Gordon D. Wilson, Massey Sta.	Berkshire and Chester White	8 77	21 97	13 20
Northumberland.	Joseph Hopps, R.R. No. 5, Campbellford	Yorkshire and Tamworth Cross	10 65	23 54	12 89
Frontenac	Wm. Shillington, Bobs Lake	Yorkshire	11 16	23 61	12 45
Leeds	Alton Shaw, Athens	Yorkshire and Tamworth Cross	9 81	22 25	12 44
Renfrew	Charles Burgess, R.R. No. 2, Renfrew	Yorkshire	14 69	26 91	12 22
Manitoulin	Roy L. Pyette, Tehkummah, Manitoulin Is	Yorkshire	10 86	23 04	12 18

WINNERS IN FEEDING HOGS FOR PROFIT COMPETITIONS, 1916.—*Continued.*

County.	Winner.	Breed.	Average cost production.	Average Value.	Average Profit.
Dundas and W. Stormont	Merton Casselman, Iroquois	Tamworth and Yorkshire Cross	10 44	22 57	12 13
Simcoe	Thos. F. Swindle, R.R. No. 3, Orillia	Yorkshire	12 56	24 72	12 06
Peel	Fred Chapman, R. R. No. 1, Kleinburg	Yorkshire	9 21	21 12	11 91
Kent	Willard S. Simpson, Ridgetown.	Yorkshire	10 82	22 65	11 83
Kenora	William E. Morton, Dryden	Yorkshire	14 61	26 22	11 61
Kenora	Harvey Skene, Dryden	Yorkshire	10 46	21 85	11 39
Carleton	Clifford Campbell, Fitzroy Harbor	Yorkshire	7 59	18 97	11 38
Waterloo	Grant Gingerrich, R.R. No. 1, Blair	Yorkshire and Berkshire Cross	19 68	8 56	11 12
Grenville	Robert J. Kelso, R.R. No. 2, Spencerville	Yorkshire	8 64	19 55	10 91
Bruce	Gilbert Marshall, R.R. No. 2, Teeswater	Yorkshire and Tamworth	8 78	19 51	10 73
York	Hector R. Paterson, R.R. No. 2, Gormley	Yorkshire	11 21	21 88	10 67
Waterloo	Howard S. Snider, Box 203, Waterloo	Yorkshire	9 42	19 84	10 42
Wentworth	E. H. Cline, R.R. No. 1, Stoney Creek	Yorkshire and Berkshire	11 53	21 47	9 94
Sudbury	D'arcy P. McDonald, Warren, Ont.	Yorkshire	8 39	18 02	9 63

DAIRY PROFIT COMPETITION

This competition was conducted this year for the first time, and from reports received by District Representatives, there is every reason to believe that it will become one of the most interesting competitions held among farmers' sons. Competitions were conducted in 11 different counties, 33 competitors taking part. The following are the rules and regulations of the dairy contest:

DAIRY PROFIT COMPETITION, 1916.

1. Open to all young men under 30 years of age who have taken the Course in Agriculture conducted by the District Representative, except winners in previous competitions.

2. The prize is a two-weeks' Course in Live Stock and Seed Judging at the Agricultural College, January, 1917, railway fare to Guelph and return and two weeks' board.

3. The prize will be awarded to the young man showing the largest net profit from one heifer.

4. There must be four entries before a competition can be conducted, and unless three complete the contest no prize will be awarded. If there are eight entries and six complete the contest, two men will be sent to Guelph. Entries close April 1st, 1916.

5. The competition will extend over a period of eight months.

6. A heifer freshening for the first time must be used, only one may be entered by each contestant, and no change of heifers can be made after the record work begins.

7. At the time of entry the District Representative will inspect the heifer and make a record of its markings.

8. The contestant must feed, milk and have full charge of the heifer, and must weigh and take samples of the milk.

9. Each contestant must take a two-ounce sample of the milk (one ounce in a.m. and one ounce in p.m.) three times a month, preferably the 10th, 20th, and 30th, of the month, and at the end of each month forward the samples to a place determined by the Representative, where they will be tested for butter fat.

10. Milk must be weighed and recorded at each milking on forms supplied by the Representative. At the end of each month the contestant will mail form for the month to the District Representative.

11. An accurate account must be kept of the kind and amount of feed consumed. The District Representative will supply forms on which to give record of feed consumed each month. The contestant will fill in form (in duplicate) each month and mail to the District Representative. The Representative will add the other data required to determine the net profit for the month and return one form to the contestant. At the close of the competition, the Representative will total these monthly statements, and fill out final report form (in typewriting) for each contestant. Final report forms will be supplied by the Department.

12. Any contestant who fails to fill out accurately the forms supplied by the Representative will be disqualified.

13. The milk will be valued on the following basis:

First three months, butter fat valued at	30c. per lb.
Second three months, butter fat valued at	33c. per lb.
Last two months, butter fat valued at	35c. per lb.

The total amount of skim milk or by product (obtained by subtracting the total pounds of butter fat from the total production of milk during the test) will be valued at 20c. per cwt., and credited to the total receipts in making up the final profit.

14. The District Representative will visit each contestant at least twice during the competition, see one milking weighed and take a sample for testing.

15. All final reports must reach this Department by December 15th. The Representative will be held responsible for their accuracy.

The following statement gives the results secured by the winners in each county:—

DAIRY PROFIT COMPETITION, 1916

County and Winner	Value of Feed	Milk lbs.	Fat %	Fat lbs.	Value	Skim milk lbs.	Value	Net Profit
Lactation Period 8 months	$ c.				$ c.		$ c.	$ c.
Leeds—								
Leonard Scott, Athens (Holstein)	26 66	8,917	3.7	290	93 56	8,621	17 24	84 15
Dundas—								
Merritt Campbell, Finch (Grade Holstein)	15 63	6,831	4.15	273	86 58	6,529	13 04	84 00
Haldimand—								
L. Molick, Canboro (Durham)	28 26	7,265½	3.96	287	92 20	6,979	13 95	77 89
Peel—								
Russell Jamieson, Streetsville (Holstein)	37 45	7,758	3.7	287	91 52	7,479	14 95	69 00
Grenville—								
A. I. Lewis, Kemptville (Durham Grade)	26 58	7,278	3.56	256	79 01	7,022	14 03	66 46
Grenville—								
H. Burnie, Spencerville (Holstein)	54 16	9,652	3.23	309	98 90	9,343	18 65	63 39
Hastings—								
J. B. Thompson, Stirling (Holstein)	12 20	5,883½	3.21	186	59 64	5,282	10 56	58 00
Frontenac—								
M. Shillington, Bobs Lake (Holstein Grade)	16 15	5,845	2.85	204	65 54	5,542	11 28	57 07
Lactation Period 7 months,								
Glengarry—								
M. A. McLennan, Lancaster (Ayrshire)	14 00	5,381½	4.44	235	76 42	5,146	10 27	72 69
Lanark—								
V. McKellough, R.R. No. 4, Almonte (Holstein)	19 16	6,159	3.55	211	66 73	5,948	11 90	59 47
Wentworth—								
A. Smith, Jerseyville (Holstein)	22 06	4,786	3.75	177	57 90	4,607	9 20	45 04

JUNIOR FARMERS' IMPROVEMENT ASSOCIATION

As I intimated in a former report, Junior Farmers' Improvement Associations are made up of the young men who have taken the four to six weeks' courses in agriculture conducted by District Representatives. Wherever a Short Course is held an Association is formed in order that these young men may not lose interest and that they may continue to follow up many lines of work, experimental and otherwise. At present there are 68 associations with a total membership of 1,617.

A prize winning flax plot.

These Associations hold meetings throughout the winter and summer months for the purpose of discussing agriculture and other questions of interest to the general welfare of the community. It is found that the members of these Associations, having had some training in scientific agriculture, are very useful to the District Representative in conducting experiments or demonstrations. The following list of experiments outlined by the members of one Junior Farmers' Association will serve to give some idea of the work undertaken by these young farmers:

EXPERIMENTS.

1. Liming and clean cultivation for eradication of horse tail.
2. Cost of hand pulling purple cockle from a wheat field, one acre—does it pay?
3. Experiment with fanning, once, twice, three, four times—does it pay?
4. Buying screens and hand cleaning, by the association.
5. Hand picking, large, plump, bright.
6. Planting potatoes, May 15th, 22nd, 29th, June 6th, 13th, 20th, to see when is best time to plant, with spray.
7. Same as 6, only not spray.
8. One, two and three eyes, and whole potatoes.
9. Large, small and medium, and see number marketable.
10. Close planting, medium and far planting.
11. Top dressing after tubers start to form.
12. Liming for potatoes.
13. Thick and thin sowing of corn.
14. Lime for a catch of clover on ridges, on hollows, on clay, on sand.
15. Picking smut off corn field.
16. Top dressing currants, prune currants and gooseberries.
17. Renovating an old patch of strawberries—does it pay?
18. Many narrow rows, or few wide rows; which pays?

19. Summer pruning of raspberries. Do canes die back or do you get much new growth, and good or poor berries?
20. Control of pear blight.
21. Thinning of apples.
22. How much wood can be cut out and still not have great wood growth? (Varieties vary.)
23. Using various paints, and not painting—which pays faster?
24. Amount of density of leaves and prevalence of inkspot.
25. Keeping records of milk.
26. Sweet clover as a pasture on blow sand.
27. Inoculation of alfalfa seed.
28. Inoculation of peas and beans.
29. Production of mangel seed.
30. Inoculation of red clover.
31. Production of beet seed.
32. Production of carrot seed.
33. Production of tomato seed.
34. Production of garden pea seed.
35. Production of seed of early sweet corn.
36. Testing onion seed from Vineland.
37. Testing beet seed from Vineland.
38. Testing carrot seed from Vineland.
39. Conducting some of the 30 experiments of Experimental Union. Write Prof. Zavitz, O.A.C., Guelph, telling him you want some application forms, as a number of your fellows want to try experiments.
40. Planting mangel seed in July so as to have small mangels to keep over winter and produce seed next year.
41. Sowing one bushel of oats, one and one-half bushels, two bushels, two and one-half bushels, etc.
42. Using ground rock phosphate as a fertilizer.
43. Growing seed corn under control.
44. Production of registered seed.
45. Winning at the fall fairs with common stuff only, select carefully.
46. Originating better varieties.

Many instances might be given showing the remarkable work being carried on by these young men under the direction of the District Representatives. The following letter addressed to a District Representative by a member of the Junior Farmers' Association illustrates this point:

"I am writing you with regard to the experiments I tried out this summer. You will remember when you advised me to go into this work, and by taking your advice, I have gained some useful information along different lines of farming. It was not only helpful to myself but all the neighbors and a great many more friends and acquaintances became acquainted with the different results and watched the results with as much interest as I did.

"This year I experimented with nine different kinds of oats, seven different kinds of corn, four different kinds of spring wheat, three different kinds of barley, two kinds of spring rye, two kinds of buckwheat, three varieties of beans, and two of alfalfa. Besides this I had an experiment with thin and thick sowing of oats.

"I will now endeavor to describe some of the experiments and how I carried them on. The first one I mentioned was oats. For trial, I had O.A.C. No. 72, O.A.C. No. 3, Banner, Siberian, Abundance, Daubeney, Storm King, Early Dawson, White Oats, Joanette, and Pioneer Black Oats. The first three mentioned were put in plots one rod by two rods each, then the rows were about eight inches apart. They were all hoed three times during the summer, and kept as clean as possible, giving them as much chance as possible to do well. The other seven varieties mentioned were put in two rows each one rod long. Of the first three, the O.A.C. No. 72 had by far the greatest bulk of straw, although in yield the Banner surpassed them. The O.A.C. No. 72 were also a little more inclined to rust and lodge than the Banner. However, if it was straw that was wanted, the O.A.C. No. 72 had the Banner beaten. The O.A.C. No. 3 are not a heavy-strawed oat, or not a heavy yielder, but they fill the bill for which they were originated, namely, an early oat to ripen with barley. This they did, maturing in exactly the same number of days as the No. 21 Barley. This was certainly information worth having, but the chief feature of the O.A.C. No. 3 was their beautiful appearance. Right from the time they came up until they were threshed there was not another kind of oats could touch them for general appearance. They all grew just the same and when

ready to harvest were just as level on top of the plot as if they had been trimmed. The straw was also as white as if it had been bleached. The grain also presents a nice appearance after being threshed, but they will not fill the mow or granary as fast as the other two varieties. The other varieties I tried more for their stooling qualities. The Siberian was a very good stooler, something similar to the O.A.C. No. 72; in fact you could trace the relation between the two oats. The Abundance was a very poor stooler and when sowed with the same quantity of grain per acre as the others, proved a light crop. The Daubeney was a good stooler, an early oat, and the relationship between it and the O.A.C. No. 3 could be easily traced. The Storm King and Early Dawson were both, in my estimation, a poor oat, being light yielders and very heavy in the hull. When I sowed the two kinds of black oats, I was told one was very good and the other very common. This I found out, the Joanette being a very good yielder with a thin hull, while the Pioneer was a coarse, short-strawed oat, a poor yielder with a heavy, thick hull.

"In the corn I had seven varieties. I tried this experiment out last year and the results were comparatively the same although I had a heavier crop this year than last. The results I will give you as follows:

Lunch time at the school fair.

Kind.	Lbs. silage.	Lbs. husked corn.
Bailey	48	12
White Cap	49½	13½
Golden Glow	56½	19½
Wisconsin No. 7	45	18
Longfellow	42	13
Saltzer's North Dakota	43	11
Crompton's Early	43	12

"In weighing this corn the same number of stalks of each were weighed and husked, and in selecting, as near an average of each variety as I could get, was taken. The spring wheat was something new to me. We never tried to grow it before. For varieties I had Marquis, Colorado, Wild Goose and Polish Wheat. On account of the lateness and wetness of the spring, the wheat was late in maturing. Wild Goose gave the best results; Colorado came second, Marquis third and Polish last. The Polish wheat was a great curiosity in this part of the country, and created a great deal of interest among the people who visited the plots during the summer.

"The barley I tested out was of some interest. O.A.C. No. 21 giving the best results. California Brewing barley came next and Guy Mayrle (a hulless barley) came third. The O.A.C. No. 21 took the longest of the three to mature, being three days later than California Brewing, and two days later than Guy Mayrle. As I remarked, when speaking of the oats, O.A.C. No. 21 barley matured in the same number of days as No. 3 oats. These two varieties would make an extra good mixture for mixed grains.

"The Ontario Agricultural College has originated a variety of spring rye which they advocated as a splendid yielder, and the grain is of extra quality. I tried out O.A.C. No. 61 spring rye and common spring rye. My plots were one rod by two rods and I must say the O.A.C. No. 61 spring rye is a good variety. It will yield nearly half as much again as the common spring rye, and the grain is much superior. I think that it could be profitably sown with O.A.C. No. 21 barley and O.A.C. No. 3 oats as a mixed grain crop, as the time for maturity is nearly the same, there being only a day or so difference, and I do think that the grain would be valuable for hog feed.

"I had two different kinds of buckwheat, Rye Buckwheat and Silver Hull. Personally I liked the Silver Hull. It probably would not turn out as well, but the appearance of the grain was superior. It also grew up taller and was much easier to harvest. As for beans, I had Pearce's Improved Tree beans, Yellow Eyed beans, and Common Tree beans. Pearce's Improved Tree beans were my favorite. Yellow Eyed beans were second and Common Tree beans third. I liked Pearce's Improved Tree beans because they grew up well and the pods were very seldom on the ground.

"For alfalfa I had Grimm's Variegated and Northern Grown. Of course, Grimm's Variegated was first, although Northern Grown proved very good. This ended the different varieties of grain under experiment, but I had another one on thin and thick seeding. I had a piece of ground probably two rods and a half long, by one rod wide. About half of this I sowed to grain at the rate of about five bushels to the acre, then part of what was left I sowed in hills about fourteen inches apart each way. In some of the hills I put four kernels, and as high as eighteen in some. Then I sowed some in rows at different widths from each other. They ran from six inches to two feet. Out of all the experiments the grain was the best quality in the rows that were sown about eight inches apart. Where it was sown so thick it was poorly headed, the straw was light and it lodged badly before it was ripe, so by this I might suggest that ordinary seeding is best.

"I had a lot of work, but I think the information I gained well repaid me for my trouble. I do think that the best way to find out anything is to get it for yourself and then it will stay with you."

Junior farmers have put on educational exhibits at many of the fall fairs throughout the Province. These exhibits have created very considerable interest and have drawn many people to enquire into the meaning of the Junior Farmers' Associations. As a result of these exhibits many appreciative remarks have been passed in regard to their work, and people generally have come to realize more fully the value of the courses in agriculture attended by these young farmers.

A number of these Associations have arranged excursions to the Ontario Agricultural College at Guelph and other places of interest, including auto excursions for the purpose of visiting breeders of pure-bred live stock, and studying the agriculture of sections somewhat distant from their own communities. Other features include picnics, inter-debates, co-operative buying and selling, etc. The following programme arranged by one Junior Farmers' Association illustrates what an organization of this kind can do for an agricultural community during the winter months:

Meetings are to be held every Tuesday evening, and it is to be a three week rotation, having literary night, social night, and agricultural and domestic science night as follows:

1. *Literary.*—Debates, speeches, spelling matches, mock trial, mock parliament, reviews of books, favorite authors, current events, scientific features.

2. *Social.*—Skating, snowshoeing and sleigh-ride parties, Xmas tree, dances, amateur play, wedding ceremony, house parties, taffy pull, masquerades, carnivals, etc.

3. *Agriculture.*—Addresses from outside speakers on agricultural subjects, reports from boys taking part in the various competitions, discussion on reports, accounts by members doing farm bookkeeping, account of visit to the O.A.C. by winners of competitions. Have groups of boys show by a single act or by tableaux some one farm operation, e.g., treating grain for smut, judging poultry or candling eggs. One of the boys might prepare a paper or talk on the principles of the gasoline engine or the care of the farm auto, another on the place of the milking machine or traction plow, etc., on the farm. Lantern slide lectures.

4. *Domestic Science.*—Lectures on care of house plants, hanging pictures, color schemes in home furnishings and decoration, power machinery and other labor saving devices in the home, house planning, home nursing and first aid (probably by the local doctor), embroidery, textiles, sanitation, table setting, how to entertain.

The fourth meeting will be literary again, and so on. Boys and girls will meet together for (1) and (2), and separately for (3). Where the programme is of a general nature and of interest to outsiders the meeting should be made an open one.

INTER-COUNTY LIVE STOCK JUDGING COMPETITIONS

This contest is open to teams of three young men from each county, who have taken a Short Course under the District Representative. The western counties competed at the Guelph Winter Fair for the Duff trophy, which was won this year by York County. In Eastern Ontario the competition was held at the Ottawa Winter Fair and the young men from Dundas County succeeded in carrying off the Peter White trophy. As an evidence of the interest taken in these two competitions, 21 counties out of a possible 23 in Western Ontario, and 12 out of a possible 13 in Eastern Ontario were represented in this contest. Since these two contests were inaugurated a year ago there has been a desire to bring the winning teams for Eastern and Western Ontario together to compete for the championship of the Province. This has been accomplished through the generosity of the Union Stock Yards Company and the Toronto Packers, who donated a handsome sterling silver trophy and arranged to pay the expenses of both teams taking part in the contest. The contest was conducted at the Union Stock Yards under the direction of competent live stock judges, and was keenly contested throughout, Dundas County winning the championship by the small margin of seventy-six points. The day following the contest these young farmers were taken through the stock yards and abattoirs, where they secured a great deal of valuable information in regard to the methods of marketing and slaughtering live stock. The following is a summary statement of a score secured by each team taking part in the contest:

	Dundas.	York.
Swine	338	453
Sheep	508	506
Dairy cattle	257	182
Horses	475	385
Beef cattle	388	361
Total	1,960	1,887

HOME GARDEN CONTEST

The Home Garden Contest, which was conducted by the District Representatives for the first time this year, is designed to interest boys and girls in agriculture between the ages of 12 and 15, and to encourage the use of a greater variety of

One of the home gardens.

vegetables in the farm home. This contest was conducted in 25 counties and 625 children in all took part. From present indications this contest will be conducted in at least 40 counties this year, with about 2,000 children taking part in the competition. The Department supplied a plan of the garden, showing the arrangement of the crops, and literature giving definite instruction on the preparation of the soil and the cultivation of the crops. During the summer months these plots were carefully inspected and judged by the District Representatives, and prizes were given for the best gardens. In several cases the children were so successful with these gardens that they exhibited their products at township fairs, where they succeeded in carrying off several of the prizes offered for vegetables.

Training the girls to beautify the home.

SMUT CAMPAIGN

In 1915 it is estimated that the farmers of Ontario lost $5,000,000 as a result of smut affecting grain crops. In many cases the loss exceeded 25 per cent. of the crop. Experiments conducted by the Department have demonstrated that the use of formaldehyde will absolutely control this fungus disease, and while this method of treating grain had been previously brought to the attention of the farmers, it was not very generally adopted. Realizing the seriousness of the situation, the Department, through the District Representatives, inserted advertisements in all the weekly papers throughout the Province, calling attention to the importance of treating grain for seed and outlining the method of treatment. Posters giving similar information were placed in conspicuous places throughout the country and the District Representatives held meetings for the purpose of demonstrating the proper methods of treating grain. As a result of this campaign it was very gratifying to find an increase of 400 per cent. in the use of formalin throughout the Province as compared with the previous year. The following statement from one county shows the sale of formalin by twelve druggists for 1915 and 1916:

1915	1916
.....	160 pints
.....	40 "
.....	15 "
4 pints	160 "
.....	40 "
.....	40 "
.....	40 "
.....	34 "
.....	36 "
15 pints	140 "
4 pints	40 "
.....	65 "
23 pints	810 pints.

This is a total of 2⅞ gallons for 1915 as compared with 96.58 gallons in 1916. Estimating that one pint of formalin would treat 40 bushels of grain and 1½ bushels of barley or oats would be sown per acre, we have the following interesting comparative figures:

1915—Bushels of grain treated, 920, representing 613 1/3 acres.
1916—Bushels of grain treated, 30,920, representing 20,613 1/3 acres.

POULTRY BREEDING STATIONS

Unlike almost any other class of stock the poultry is of special interest to every county and district in the Province. All the District Representatives are alive to this fact, and they are all endeavouring to improve the quality and methods

Poultry exhibit is an important feature of the school fair.

of caring for this class of live stock. One of the most important ways of improving the poultry is through the supplying of eggs of desirable breeds to the children taking part in the Rural School Fair movement. For the first few years these eggs were supplied from the Ontario Agricultural College, but the demand for eggs has become so great that the District Representatives have been compelled to look else-

where for the major part of the eggs required for their respective counties. In order to meet this demand poultry breeding stations are being established. For this purpose farmers are selected who agree to establish a flock of hens of a desirable breed and erect suitable buildings for housing them. During the winter months the District Representative inspects these flocks and culls out all the undesirable birds and supplies cockerels to mate with the flocks. The farmer agrees to supply eggs for School Fair purposes at a fixed rate per setting. In this way the District Representative not only insures a supply of good eggs for his work, but also is instrumental in inducing a number of farmers to keep better flocks of hens which act as a demonstration to other farmers in the community. The following is a list showing the breeding stations established in each county:

POULTRY BREEDING STATIONS.

County	No. of Station	No. of Hens.	No. of Cockerels
Algoma	No. 1	20	2
	" 2	30	2
	" 3	15	1
Brant	No. 1	20	2
	" 2	30	2
	" 3	45	4
Bruce	No. 1	120	5
	" 2	85	4
Carleton			
Dufferin	No. 1	100	4
Dundas	No. 1	75	6
	" 2	50	4
Durham			
Elgin	No. 1	50	4
	" 2	100	6
Essex	No. 1	100	6
	" 2	80	5
	" 3	40	4
	" 4	40	4
Frontenac	No. 1	75	4
Glengarry	No. 1	25	2
	" 2	80	7
Grenville	No. 1	50	2
	" 2	24	1
	" 3	26	2
	" 4	45	2
	" 5	28	1
	" 6	48	2
Grey	No. 1	40	2
	" 2	40	2
	" 3	75	3
	" 4	80	4
	" 5	40	2
Haldimand	No. 1	80	4
	" 2	40	2
Halton	No. 1	30	2
	" 2	45	3
	" 3	50	4
	" 4	25	2
Kenora	No. 1	25	1
	" 2	15	1
	" 3	12	1
	" 4	50	3
Kent	No. 1	80	4
	" 2	70	4
	" 3	30	2
	" 4	50	2
	" 5	25	2
	" 6	9	1

POULTRY BREEDING STATIONS—Continued

County	No. of Station	No. of Hens	No. of Cockerels
Lambton	No. 1	60	4
	" 2	30	2
	" 3	45	3
Lanark	No. 1	55	2
	" 2	55	2
Leeds	No. 1	35	2
	" 2	45	3
	" 3	125	9
Lennox and Addington	.....	.....	.....
Middlesex	No. 1	100	6
Norfolk	No. 1	29	2
	" 2	40	3
	" 3	15	2
Northumberland	No. 1	.....	.....
	" 2	.....	.....
Ontario	No. 1	200	.....
	" 2	25	2
	" 3	80	6
	" 4	50	3
	" 5	50	2
	" 6	125	6
Oxford	No. 1	70	5
	" 2	41	3
	" 3	58	4
	" 4	30	2
Peel	No. 1	60	4
	" 2	100	7
Peterboro	No. 1	75	4
	" 2	90	5
Prince Edward	No. 1	185	12
Rainy River	No. 1	25	2
	" 2	25	2
Renfrew	No. 1	63	3
	" 2	34	2
	" 3	40	2
Simcoe	.....	.....	.....
Fort William	No. 1	30	3
Port Arthur	No. 1	30	2
	" 2	40	3
Timiskaming	No. 1	.....	.....
Victoria	No. 1	60	4
Waterloo	No. 1	35	3
	" 2	80	4
	" 3	100	5
Welland	No. 1	35	3
	" 2	12	1
Wentworth	No. 1	60	4
	" 2	50	3
	" 3	70	4
	" 4	35	2
York	No. 1	80	4
	" 2	50	3
	" 3	40	3
	" 4	40	3
	" 5	40	3

FARM BOOK-KEEPING

District Representatives are each year devoting more attention to farm management and book-keeping. The demand for assistance along this line is particularly noticeable among the young farmers who have taken Short Courses under the direc-

tion of the District Representatives. The Leitch system of farm book-keeping is the one being used by the District Representatives; it is very simple, yet, for the average farmer, is quite satisfactory for his needs. This system is a loose leaf system with a spring-back binder, so that it may be added to from time to time. Four of these books were supplied to each Representative and loaned to farmers who agreed to keep an accurate record of their business and permit the District Representative to have access to their records—the information secured to be confidential. District Representatives are also supplied with the loose leaves of this system and instructed to supply them to the farmers free of charge. As a result of this plan the District Representatives have induced a number of farmers to keep an accurate record of their business. Through the co-operation of the farm-management department of the Ontario Agricultural College a few of the District Representatives have induced farmers not only to keep books, but also to keep actual records of the cost of the growing of the various crops on the farms. This work, however, has only been operating for a short time and no figures are available at present.

DEMONSTRATIONS IN CONTROLLING LATE BLIGHT ON POTATOES

In view of the prevalence of blight in 1915 which resulted in a great financial loss to the farmers of Ontario, the Department, through the District Representatives, made a special effort this year to have the farmers of the Province secure sound seed and spray their potatoes throughout the growing season. In a number of counties special demonstration plots of one-quarter an acre were conducted with the co-operation of the farmers. In one county where this was carried out the following directions were supplied to the farmer co-operating:

1. Dissolve 8 lbs. of blue stone in a couple of gals. of warm water and make up to 8 gals of solution.
2. Slake 8 lbs. of fresh lime in water and make up to 8 gals. Keep the above mixtures in separate vessels until ready to spray.
3. Start spraying when plants are 6 to 8 inches high and spray approximately every 2 weeks until four applications have been put on. This would be putting on, say, two applications in July and two in August, which should run your crop past the danger of blight.
4. In making up the spray mixture from the above, add 2 gals. of blue stone to 10 gals. of water. Add 2 gals. of lime solution, after it has been well stirred, to 10 gals. water and then pour the two mixtures together just when you are ready to spray. This will make up 20 gals. or sufficient mixture to cover nearly half an acre of potatoes. Spray with a fine mist spray if possible. An apple tree outfit does very well. Try to get the mixture on under surface of leaves as well as on top.
5. Leave a few rows next to the sprayed portion without spraying and dig them and measure or weigh for comparison in the fall.

NOTE:

6. Do not mix the remaining portions of the material until ready to spray each time.
7. The District Representative will endeavor to inspect your plot during the summer.
8. A bulletin is being enclosed outlining the nature of the late blight of potatoes.

DEMONSTRATION ORCHARDS

For a number of years the District Representatives in the apple growing sections of the Province have been conducting demonstration orchards. For this purpose the plan usually followed is to select a somewhat neglected apple orchard near a well-travelled road. This orchard is put into first-class condition and usually controlled by the District Representative for three years. A careful record is kept of all the expenses with a view to demonstrating the profits resulting from the well cared for orchard. For the past year or two, however, this plan has not been generally adopted, farmers having become more convinced of the importance of

taking better care of their orchards, so that the District Representatives' efforts are confined more to assisting the individual fruit grower. The following statement of the results secured by a District Representative conducting a demonstration orchard this year will be of special interest in view of the very unsatisfactory season for producing clean fruit:

EXPENDITURES.

Cultivation:	
Sod mulch system.	
Cutting grass, ½ day, man and team at $4.00	$2 00
Pruning:	
4 days, 1 man at $2.00 per day	8 00
½ day gathering brush at $2.00	1 00
Spraying:	
Power outfit spraying 6 times, 6 hours each time at $1.00 per hour	36 00
Picking:	
120 bbls. apples at 25c. per bbl.	30 00
Packing and Grading:	
120 bbls. at 35c. per bbl.	42 00
Cost of Spray Material, 6 Applications:	
85¾ gals. lime sulphur at 17c. per gal.	14 58
65 lbs. lead at $9.15 cwt.	5 95
Packages:	
120 lbs. at 45c. each	54 00
Hauling Fruit to Station:	
5 trips, three miles at $1.50 per trip	7 50
	$201 03

RECEIPTS.

84	bbls.	No. 1 McIntosh Red at $6.00	$504 00
14	"	2 McIntosh Red at $5.00	70 00
16	"	3 McIntosh Red at $3.00	48 00
1	"	1 Wealthy at $3.00	3 00
1	"	2 Wealthy at $2.00	2 00
1	"	1 Mann at $3.00	3 00
2	"	1 Duchess at $2.00	4 00
1	"	1 Pewaukee at $3.00	3 00
			$637 00

Receipts	$637 00
Expenditures	201 13

Net profit, $436.97 from 1¼ acres, net profit per acre, $349.57.

ALFALFA EXPERIMENTS

Splendid field of clover in the Dryden District.

Recognizing the value of alfalfa, both from the beneficial effect upon the soil and its value as hay, the Department has endeavoured to encourage its more general use. The difficulty has been, however, in securing seed of a hardy strain, and, as a result, many farmers have purchased southern grown alfalfa seed and have become discouraged. The District Representatives, in co-operation with the Field Husbandry Department at the Ontario Agricultural College, for the past two years have been conducting experiments throughout their respective counties. The variety of alfalfa used

is known as "Grimm" and the test is being made both for seed and fodder production. The regulations under which these experiments are being conducted are as follows:-

1. At least forty rods from any alfalfa field select land which has a good natural underdrainage, and preferably soil of rather a heavy character, elevated and sloping, and which is comparatively free from weeds and from weed seeds.
2. Thoroughly cultivate the soil as early in the spring as the land is dry enough to work to good advantage.
3. Sow on the selected acre three pounds of Grimm alfalfa seed in rows thirty inches apart, as soon as possible after the land is cultivated, and while it has plenty of moisture.
4. Cultivate between the rows occasionally throughout the season to destroy the weeds, and to conserve moisture. Practice level cultivation.
5. In the spring of 1916, again cultivate the land thoroughly, and keep the crop free from weeds.
6. On one-half of the land allow the first crop in the season to remain for seed. Cut the crop when the pods have become brown.
7. On the other half of the acre use the first cutting for hay, and allow the second crop in the season to produce seed. The crop for hay should be cut when it is starting to bloom, or when the young shoots are starting to grow from the crowns of the roots. All crops should be cut from *two to three inches above the crowns* of the roots to prevent the killing of the plants.

It is expected that seed can be produced from this acre for a number of years, if the foregoing directions are followed. After 1916, the grower is at liberty to use such methods as he desired.

These experiments will be completed in 1917 when it is expected some valuable information dealing with this very important question will be given.

DRAINAGE

District Representatives have rendered valuable service to the farmers in making drainage surveys and assisting them in putting in tile drains. This feature of their work has proven to be even more important during the past year, owing to the excessive wet weather which served to emphasize the importance of having land well drained. While a large percentage of this work is devoted to making drainage surveys, the District Representatives are often called upon to make drainage awards, and in this way the farmers are relieved of the expense of having this work done through the Council. Quite a number of applications received have been for surveying profiles for old main drains which have to be relaid. This is due to the fact that many of these drains have been put in without being properly surveyed, and as a result fail to carry off the water. There are many cases also where District Representatives receive applications from township officials to make surveys where drains are being put in to drain the roadsides. Owing to the unusual demands for work of this nature, the District Representatives find it necessary in many cases to secure the assistance of men employed by the Physics Department of the Ontario Agricultural College, Guelph.

The following is a list of applications made to a District Representative for assistant in drainage work in one county, giving the number of acres surveyed, or length of profile, and number of awards made:

Length of Profile of Area surveyed	Awards	Work done by
Work to be done		
Work to be done		
85 acres	Awards	Department of Agriculture
20 acres	"	" "
3,000 feet	"	Physics Department
13 acres	"	Department of Agriculture
Work to be done		
Work to be done		
Work to be done		
15 acres		Physics Department
600 feet	Awards	Department of Agriculture
40 acres	"	" "
12 acres	"	Physics Department
40 acres	"	Department of Agriculture
Work to be done		
Work to be done		
40 rods		Department of Agriculture
Work to be done		" "
One-half mile		Physics Department
Work to be done		
Work to be done		
200 rods	Awards	" "
4 miles	"	" "
Work to be done		
8 acres		" "
40 rods		Department of Agriculture
2,000 feet		Physics Department
23 or 30 acres		Not done
Work to be done		
Work to be done		
Work not done		
Work not done		
Work not done		
12 acres		Physics Department
2,800 feet	Awards	" "
2,200 feet		" "
10 acres		" "
1,100 feet	Awards	" "
1,000 feet		" "
10 acres		" "
2,000 feet	Awards	" "
3,900 feet		" "
15 acres	Awards	" "
40 rods	Awards	" "
4,300 feet	Awards	" "
2,000 feet		" "
1,500 feet		" "
2,000 feet		" "

REFORESTRATION

District Representatives are giving considerable attention to the question of reforestration. In a number of counties, they have been instrumental in establishing plantations, which have served to demonstrate what may be done with land unsuited for cultivation. The following extract from a District Representative's report will serve to illustrate:—

"In a number of places throughout the county there are sand hills upon which apparently nothing could be made to grow, and which give an endless amount of trouble, especially along roadsides, where every windy day fills the road full of sand. One particularly bad hill lies on the road about midway between Kemptville and Spencerville, on the Selleck property. This sand hill has drifted across the road allowance, and several strips of land have been purchased from the owner of the adjoining field, in order to get around the sand. Every effort to stop sand blowing has failed, three high board fences have been buried, and it is an every day occurrence to see autos stuck in the middle of the road.

"With the idea in view of attempting to stop the sand blowing we decided to conduct a Reforestration experiment, to see if it would be possible to grow trees on this sand. Five thousand four hundred trees were secured in the spring from the Forestry Branch of the Department of Agriculture, and set out carefully in rows four feet apart, with the trees four feet apart in the row. We further experimented by hauling cedar brush and covering over half the area with it. I am pleased to state that at present

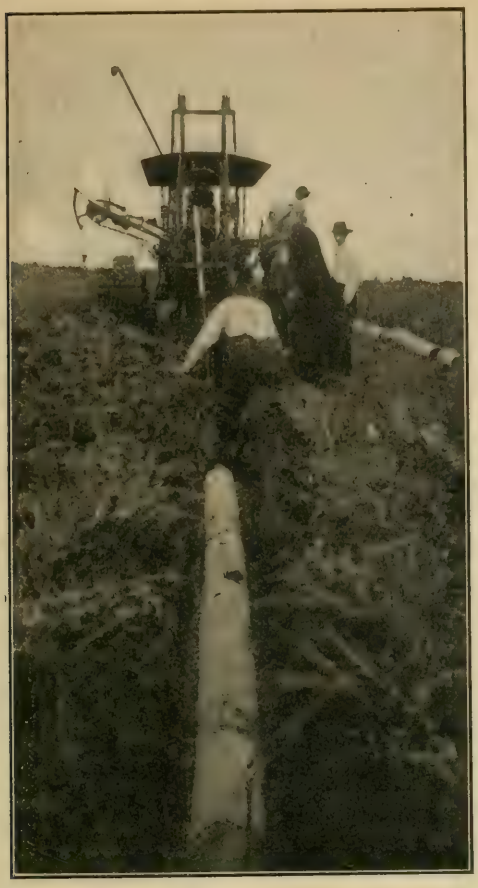
Reforestry on the sand.

nearly all the trees over which we put the brush are living and doing well. These will, no doubt, in the course of a year or two stop the sand from blowing. The trees which we did not cover did not do so well, and many of them were either covered with the blowing sand, or blown out by the roots. Next spring we purpose replacing all dead trees, and covering the entire area, if possible, with cedar brush, to give the trees as good a chance as possible.

"Very little encouragement was given by adjoining farmers at the time the trees were planted, and a good deal of scepticism prevailed as to the possibility of the trees growing. However, we know that seeing is believing, and trust to have this troublesome sand hill converted into a young pine grove in the course of a few years."

DRAINAGE WORK IN NEW ONTARIO

The District Representatives in New Ontario render the same service to farmers as regards drainage as the District Representatives in Old Ontario. As a result of the country being more or less sparsely settled and the area under cultivation somewhat small, drainage has not made the same progress as it has in Old Ontario. In order to stimulate an interest in drainage and assist the farmers in a practical way, the Department, in 1915, purchased a traction ditching machine and took contracts with farmers in Algoma to dig drains and lay tile at 30c. per rod. The Department also supplied the farmers with a power cement mixer and tile machine free of charge. It was expected that this machine would be in Algoma a few months in the summer, and would be transferred to another district



First Ditching Machine in Rainy River district, placed there by the Department.

for the remainder of the season. I am pleased to report, however, that the machine remained in Algoma for the full seasons of 1915 and 1916, and still has a number of contracts in sight, which will take a considerable portion of 1917 to complete. The results of the work in Algoma were so gratifying that the Department purchased another ditching machine in the spring of 1916, and undertook similar work in the Rainy River District. This machine was also kept busy throughout the season, and will also have enough work to keep it employed throughout the season of 1917.

MEETINGS ATTENDED

In addition to the many other demands upon the District Representative, he is required to attend a great many farmers' meetings throughout the year. This not only is necessary for the purpose of giving information to the farmers of his county, but also enables him to keep in touch with their many and varied problems. The following is a list of the meetings attended by a District Representative in one County:—

Nature.	No. of Meetings.
Farmers' Club	27
Farmers' Institute	8
Fruit Growers' Association	4
Vegetable Growers' Association	2
Picnics and Entertainments	12
Rural School Fairs	6
Local School Fairs	3
Executive Meeting of Corn Growers' Association	4
Executive Meeting of Fruit and Vegetable Growers' Association	2
Annual Meeting of Farmers' Institute	1
Executive Meeting of Lambton Publicity Association	2
Executive Meeting of Lambton Co-operative Association	4
Conference of Vegetable Growers	1
Banquets	3
Executive Meeting of Agricultural Society	2
Rural School Fair Improvement Association	3
Rural School Fair Organization Meeting	3
Meetings in connection with establishment of a Sugar Beet Refinery	13
Two-Day Stock Judging Short Courses	2
Junior Farmers' Association	6
Hydro-Electric Meetings	2
Total	112

VEGETABLE SPECIALIST

The work under this head has been carried on during the past year to further the demonstration and educational work commenced during the two previous years. The results of this work have not been as satisfactory as had been hoped for, owing chiefly to climate conditions. The early part of the season of 1916 was extraordinarily wet, and the vegetable growers in the Province were handicapped to a very great extent, and their crops were not in such a condition as would clearly demonstrate the value of the experimental work which was carried on. The latter part of the season was the opposite. For a period of over six weeks practically no rainfall was recorded in very many sections devoted to the growing of vegetables. This condition, coupled with the former, made it very difficult to consider the results as being of any final value.

CONTROL OF BLIGHT

In regard to the control of celery blight, the work was curtailed somewhat owing to the enlistment of the man in charge. Spraying of celery is, however,

Shipping onions from Leamington District.

rapidly becoming a common practice in many of the market gardens of the Province, in spite of the fact that the price of blue stone ranges from twenty to thirty-two cents, per pound, as compared with six to ten cents a pound under ordinary conditions. By a careful estimate it is found that $50,000 worth of celery has been saved this year in the Province of Ontario, due to some extent at least to the demonstrational work with blue stone as a preventive of the celery blight. Attention has been drawn to the fact that blue stone of various qualities has been sold, and much of an inferior quality has been used by various vegetable growers,

and, owing to this cause, some results have not been as good as we have been able to demonstrate by the use of blue stone of the best quality available.

Control of Onion Blight. The work in the Kingston District was continued this year with negative results. The onions were grown in plots fifteen feet wide, and a boom carrier was made to support the nozzles, one for each of the rows so that Bordeaux mixture was applied directly over the plant. The work was commenced before any trace of the blight could be seen, applications being made once and sometimes twice a week. In the blighting season, however, the treated onions succumbed to the disease just as easily as the untreated ones. This is the second season that results have been of no value, and it is hoped with the use of other materials some information of use may be secured as, in this particular locality, this disease prevents over ninety per cent. of the growers producing onions as they would if the disease could be controlled.

Control of Cabbage Root Maggot. Between ten and twelve thousand cabbage and cauliflower plants were treated with corrosive sublimate to demonstrate its use as well as to establish certain results received during the summer of 1915. However, no cabbage or cauliflower plant in any of our plots was attacked by the maggot, either in the treated or not treated rows. From observations made I believe the season was so cold that the eggs were prevented from hatching.

VEGETABLE GROWERS' CONFERENCES

Conferences were held in Toronto, Hamilton, London, Brantford, Stratford, Kingston, Sarnia, Tecumseh and Burlington, a total of nine for the Province, five more than in 1915. Practical growers gave excellent addresses on phases of vegetable growing in which they were specializing, and by discussions much information was given, which apparently was of value to all present. An illustrated lecture on "Fungus Diseases and Insects Troublesome to the Vegetable Grower," was given at each conference.

DUST MIXTURE

Considerable attention has been given by orchardists to the use of fine powders of lime and sulphur as preventives of fungus diseases and insect pests. Believing that some experimental work should be carried on to secure information on these mixtures for use among vegetable growers, two machines were purchased and a quantity of different dust mixtures was applied to three common vegetable crops, namely onions, potatoes and celery. The results lead to the conclusion that considerable work can advantageously be carried on next year.

STERILIZING GREENHOUSE SOIL

Many of the vegetable growers in the Province owning greenhouses and growing crops during the winter months have had considerable trouble with some of their crops owing to various diseases and insect pests, and as sterilization of the soil has been recommended by leading authorities, it was determined to secure very reliable information on this subject in order that the results might be distributed among commercial greenhouse men. The soil in a greenhouse thirty feet wide and one hundred and fifty feet long was sterilized last fall with live steam at a pressure of from twenty to thirty pounds. The steam was introduced into the soil by various means, including land tile, inverted pans, iron pipes with small holes drilled every six inches, pipes with Skinner nozzles set every six inches and by the Spike

Harrow System. A careful record is being compiled of the quantities of lettuce, tomatoes, etc., from this house as well as from an adjoining house, which was not sterilized in the hope of being able to give some results, either in favor of or against the practice of sterilizing greenhouse soil.

STAKING TOMATO PLANTS AS A COMMERCIAL PROPOSITION

As the opinion among the growers of tomatoes in the Province at the present time is divided on the question of the practicability of staking tomatoes, a demonstration was carried on in the Toronto District to gather exact information as to time necessary to stake, trim, and tie eight hundred tomato plants. Approximately five cents per plant was determined to be the actual labor cost, which is more than paid for in securing ripe fruits earlier than from ground grown plants.

Potato planter at work in one of the potato sections.

MOTION PICTURE WORK

Some time has also been devoted to securing motion picture films of vegetable growing in various sections of the Province to assist at vegetable growers' conferences during the winter. About 1,500 feet of film showing the various phases of work connected with the growing of the following vegetables has been prepared:—tomatoes and lettuce in the greenhouse, onions, potatoes and cauliflower.

MONTEITH DEMONSTRATION FARM

The Demonstration Farm at Monteith continues to render excellent service to the settlers of Cochrane and Temiskaming districts in many ways. It is steadily being looked to more and more for information and guidance on all matters affecting the development of the country.

The work on the land, where 75 different experiments have been conducted with all kinds of crops, has not only evolved results of practical value in working out cropping systems and practices, but high-class seed has been made available to settlers. Similarly a considerable number of pure bred sires have been distributed at nominal prices as a result of the live stock breeding carried on.

The disastrous fire of the past summer just swept the fringe of the farm. All about there was loss and disorganization, but, possibly because of the larger clearing, the farm and farm buildings were saved. Thus the farm served as a haven of refuge for less fortunate settlers of the neighborhood. The Annual Excursion and Demonstration Day, which had been announced for about that time were cancelled, and the

A field of O.A.C. No. 3 oats, which yielded 60 bushels to the acre. It was sown on May 7th, and harvested on August 5th.

farm and its staff made first aid to unfortunates a primary duty. Much good work was done in this way. It was soon evident, however, that special efforts would be needed to take care of the settlers' cattle during the winter months. In the early fall therefore a contract was let to build a barn 140 ft. x 38 ft. Arrangements were also made near New Liskeard to take care of stock of settlers in that district who had suffered from other fires. In this way possibly 200 head of stock, which would have had to be sacrificed, will be preserved to the country.

RESULTS OF EXPERIMENTS

A separate Report is being issued giving results in some detail of various experiments carried on. A few, however, may be noted here.

Fall wheat has always been a successful crop, but the seeding must be done early. A yield of 30 bushels to the acre has been secured in three consecutive years. Marquis spring wheat yielded 20 bushels to the acre.

Barley has been a good crop over five successive years, with a yield of 40 bushels per acre.

In peas early, short strawed varieties have been successful on the farm and throughout the district. Flax growing is also showing promising results.

In oats the best success has been found in the use of the new variety, O.A.C. No. 3, the early maturing qualities of which seem to be well suited to the north. It yielded 60 bushels to the acre.

Good results have also been secured with red clover, alsike, timothy and alfalfa. In the past two years encouraging results have been secured in growing clover seed on the farm.

Oats, peas and vetch have been grown as a silage mixture and the results justify carrying on the experiment on a larger scale another year.

Potato growing has not been an unqualified success, even though there are no potato bugs there yet. Still a yield of 250 bushels to the acre was obtained at the farm last year. It has been shown that the crop will respond if the proper methods are adopted.

IMPORTANCE OF CULTIVATION

A most important point in reference to the cultivation of the land has been developed by the experience of the farm, and has been explained by the Superintendent as follows:—

One of the most highly important problems in northern agriculture to-day is the cultivation of the soil. Nothing in my mind is more essential to successful farming here than proper manipulation of the soil. We have not even got to the place where we know how necessary it is.

It is my conviction that ninety per cent. of the crop failures in Temiskaming are due to no other cause than poor cultivation. Regular fall plowing, which is such an important feature in good farming areas elsewhere, is almost an unknown thing here. Hundreds of farms can be seen where no fall plowing has been done at all. Even when they do plow it is usually very poorly done and often not more than three or four inches deep when it should be at least seven or eight. The ordinary one furrowed plow has done the best work for us and particularly so when we used a skimmer to turn under the weeds and grass.

Owing to the fact that our seasons are short it is necessary to get varieties that mature early in order to allow ourselves time for fall cultivation.

Our early oats not only yielded the best but they allowed us to gang plow the stubble even before the middle of August. This light plowing or discing preserves the moisture, it starts young weeds growing which otherwise would have laid dormant, these of course are plowed down in the fall. It also helps to liberate plant food for the following crop, besides making the ground more easily plowed in the fall. Nothing aids a clay farm more than real thorough after harvest and fall cultivation. Ridging the ground the very last thing in the fall is almost sure to pay and to pay well. One good plowman can ridge three acres per day, and this we found made a difference of five or ten bushels per acre in the crop. We found, too, that ridged ground can be worked earlier in the spring on account of the wind and sun acting on a greater surface, the ground dries just a little sooner than ordinary worked soil. Another advantage it has is that it costs less to put it in good condition in the spring, and it is a very important point to eliminate as much extra work in the spring as possible and yet have a good seed bed. From our experiments here on the Farm we have ascertained that one day's delay in spring seeding means at least one or two bushels per acre less in the yield. Two weeks delay usually means considerably less than half a crop. In other words if you have two weeks' plowing to do in the spring that should have been done in the fall the result will be a fifty per cent. crop, due more to lateness of seeding than to any other cause. Spring plowed ground will not stand a period of dry weather as will fall plowed ground and this also tends to reduce the yield. Too much cannot be said for thorough after harvest cultivation together with fall plowing, and it is to be hoped that the settlers over the whole Temiskaming district will take this to heart and at least make some attempt to accomplish this end for it is the key note to successful farming here.

FACTORY INSPECTION BRANCH

The following is a brief summary of the work accomplished in this Branch for the year ended October 31st, 1916:—

In the course of the year 452 cities, towns and villages were visited and 10,718 inspections made.

First inspections	7,493
Second inspections and re-visits	3,225
Total	10,718

Employees in these factories and mercantile establishments numbered approximately 243,118, males and females. Some attempt was made to exploit child labor, parties alleging scarcity of adult labor as an excuse for this breach of the Act. These cases were investigated with the result that 225 children were dismissed from the various factories, being under 14 years of age. Birth certificates were ordered and secured for about 350 others of questionable age, all showing that the legal age had been reached.

A good many recommendations were made in connection with the safety of employees, sanitary conditions, conveniences and other regulations of minor importance. Some irregularities were in evidence, but little difficulty has been experienced in having them remedied, and in comparatively few cases has it been necessary to invoke the aid of the Courts. Conditions in general are satisfactory.

Legal proceedings were taken in nine cases. Six of these were for employing children in contravention of the Act; one was for violation of Sec. 70 (Bake Shop Act) and one for failure to comply with the regulations relating to sanitation.

E. T. Wright, of Hamilton, charged with employing child labor, claimed that the boy had been engaged by a sub-contractor, who was convicted, but no penalty was imposed, the Magistrate deciding that it was not intentional violation; the boy's father was also indicted but the charge against him was dismissed.

James Shea, Superintendent at the Guelph Cotton Mills, Guelph, was prosecuted under Sec. 79 for employing child labor. He was convicted and fined $5.

Moore-Telford Co., Toronto, also prosecuted for employing a boy under the legal age was convicted and fine imposed: the parents also of the boy were indicted, but as the child had received a permanent injury were allowed to go on suspended sentence.

Information was laid against John Hilton for allowing his daughter to work in contravention of the Act. He was convicted and fined.

Levi & Labotsky, Toronto, prosecuted for neglecting to comply with orders issued regarding sanitary conditions was fined $5.

Silverstine, a baker, Toronto, was convicted of a violation of Sec. 70 (Bake Shop Act) but was allowed to go on suspended sentence.

Two other cases, in which the Inspectors were witnesses, came up. One, proceedings taken by the Crown against J. M. Lowe, Toronto, in connection with an elevator accident, was laid over. The other was something in the way of a conflict of authority in connection with a fire escape ordered by this Department. The fire escape was erected by Eberhard & Wood under the impression that the owner was the possessor of three feet more than he actually was. The fire escape thus came over the street line. The City therefore held that this was irregular as permission had not been granted to so erect it. This case also was laid over.

Several most disastrous explosions occurred during the year, resulting in some instances in loss of life and great damage to property. All were investigated, but it was found that in most cases the cause was unknown. Only one boiler explosion was reported. This occurred in a heading mill, when the centre one of three boilers exploded with such force that it toppled over a portable boiler near it and landed 25 yards out in the lake. A boy, son of the manager, was injured.

Some 258 overtime permits were issued through the year; 192 regular under Sec. 34; 35 special under Sec. 32, and 31 under Sec. 70 (Special Bake Shop). This is an increase over last year of 52, 206 being granted in 1915.

Reasons assigned on application were shortage of labor and consequent delay in getting out orders, and also to increase the output in munition plants and factories engaged on other military contracts.

The Master Bakers applied for special permission under Sec. 70, to enable them to begin baking bread at 2 p.m. (Sunday afternoon) to be subsequently followed by the introduction of day work. The Department endeavored to co-operate with them, but their organization was not complete.

Several cases of illegal overtime were reported. In some instances the excuse was that the pressing demand for munitions seemed a justification for a breach of the law. Permits to employ females on night work are only issued when assurance is given that the production is solely for the use of the Militia Department.

A very large number of blue-prints in connection with the erection, extension or alteration of buildings, involving the expenditure of large sums of money, were examined during the year. The submission of these plans to the Department makes for expediency, being a great saving of time, work and expense.

Nearly 4,500 reports were sent out to the different industries in the Province.

STATIONARY ENGINEERS' BRANCH.

The Stationary Engineer's Board was established in the year 1909 under the Minister of Agriculture, making it compulsory for all engineers operating stationary steam plants of 50 horse power or over, and carrying over 20 pounds steam pressure, throughout the Province of Ontario, to hold stationary engineers' certificates. On July 1st, 1914, an Amendment came into force compelling all engineers operating hoisting steam plants working at a pressure of 20 pounds or over, irrespective of horse power, and used for hoisting in structural operations or excavating purposes, to hold hoisting engineers' certificates. On November 1st, 1916, this Board was transferred to the Minister of Public Works, and is now a part of the Trades and Labour Branch, No. 15 Queen's Park.

During the past year, despite the fact that a large percentage of engineers have enlisted for service overseas, the Board examined over 800 candidates and issued over 9,500 certificates, these amounts including both stationary and hoisting. Considerable work is entailed in examining the candidates and renewing their certificates each year.

During the past year there has not been one single boiler explosion throughout the Province in plants operated by certificated engineers.

FORTY-SECOND ANNUAL REPORT

OF THE

Ontario Agricultural College

AND

Experimental Farm

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1917

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TORONTO

To His Honour SIR JOHN STRATHEARN HENDRIE, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to present the Forty-second Annual Report of the Ontario Agricultural College and Experimental Farm.

W. H. HEARST,

Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
TORONTO, 1917.

THE ONTARIO AGRICULTURAL COLLEGE, GUELPH

HON. SIR W. H. HEARST, *Minister of Agriculture, Toronto.*

FACULTY OF INSTRUCTION, 1916.

(All, except the President, arranged in order of Seniority.)

G. C. CREELMAN, B.S.A., LL.D. ..... President
H. H. DEAN, B.S.A. ..... Professor of Dairy Husbandry
C. A. ZAVITZ, B.S.A., D.S. ..... Professor of Field Husbandry
J. HUGO REED, V.S. ..... Professor of Veterinary Science
G. E. DAY, B.S.A. ..... Professor of Animal Husbandry
R. HARCOURT, B.S.A. ..... Professor of Chemistry
MISS M. U. WATSON ..... Director of Home Economics
JOHN EVANS ..... Professor of Manual Training
C. J. S. BETHUNE, M.A., D.C.L. ..... Professor of Entomology and Zoology
W. R. GRAHAM, B.S.A. ..... Professor of Poultry Husbandry
W. H. DAY, B.A. ..... Professor of Physics
J. W. CROW, B.S.A. ..... Professor of Horticulture
J. E. HOWITT, M.S.A. ..... Professor of Botany
D. H. JONES, B.S.A. ..... Professor of Bacteriology
O. J. STEVENSON, M.A. D.Paed. ..... Professor of English
L. CAESAR, B.A., B.S.A. ..... Associate Professor of Entomology
W. J. SQUIRRELL, B.S.A. ..... Associate Professor of Field Husbandry
MISS ANNIE ROSS, M.D. ..... Lecturer in Physiology, Home Nursing and Psychology
H. H. LEDREW, B.S.A. ..... Lecturer in Economics and English
WM. HUNT ..... Lecturer in Floriculture
MORLEY PETTIT ..... Lecturer in Apiculture
E. W. KENDALL ..... Lecturer in Manual Training
H. L. FULMER, B.S.A. ..... Lecturer in Chemistry
R. R. GRAHAM, B.A., B.S.A. ..... Lecturer in Physics
R. E. STONE, B.Sc., Ph.D. ..... Lecturer in Botany
A. W. BAKER, B.S.A. ..... Lecturer in Entomology
J. R. SPRY, B.S.A. ..... Lecturer in Physics
T. H. LUND, B.S.A. (Enlisted) ..... Lecturer in Bacteriology
F. N. MARCELLUS, B.S.A. ..... Lecturer in Poultry
H. M. KING, B.S.A. ..... Lecturer in Animal Husbandry
A. LEITCH, B.S.A. ..... Lecturer in Farm Management
G. H. UNWIN, B.S.A. ..... Lecturer in English and French
A. L. GIBSON, B.S.A. ..... Lecturer in Chemistry
A. MACLAREN, B.S.A.; ..... Lecturer in Rural Sociology
A. H. TOMLINSON ..... Lecturer in Forestry and Landscape Gardening
A. H. MACLENNAN, B.S.A. ..... Lecturer in Horticulture
MISS M. A. PURDY ..... Demonstrator in Chemistry
MISS GRACE GREENWOOD ..... Instructor in Normal Methods
MISS JEAN RODDICK ..... Instructor in Domestic Science
MRS. F. DOUGHTY ..... Demonstrator in Domestic Art
MISS ALTA V. DICKEY ..... Instructor in Domestic Art
MISS ELIZA MADDOCK ..... Supervisor of House Practice
W. H. WRIGHT, B.S.A. (Enlisted) ..... Demonstrator in Botany
MISS BELLE MILLAR ..... Demonstrator in Dairying
MISS NETTA M. NIXON ..... Demonstrator in Domestic Science
MISS H. THEODORA JOB ..... Demonstrator in Laundry and Household Administration
H. S. FRY, B.S.A. ..... Demonstrator in Horticulture
G. J. SPENCER, B.S.A. (Enlisted) ..... Demonstrator in Entomology
W. L. IVESON, M.A. ..... Demonstrator in Chemistry
J. P. SACKVILLE, B.S.A. ..... Demonstrator in Animal Husbandry
G. F. KINGSMILL B.S.A. ..... Demonstrator in Apiculture
R. J. SKELTON, B.S.A. (Enlisted) ..... Demonstrator in Dairying
R. FINKLESTEIN, B.S. in Agr. ..... Demonstrator in Bacteriology
A. V. MITCHENER ..... Resident Master and Instructor in English
K. W. FORMAN ..... Instructor in Athletics

COLLEGE OFFICERS.

S. SPRINGER ..... Bursar
S. H. GANDIER, B.S.A. ..... Secretary
A. V. MITCHENER ..... Resident Master
MISS J. GARDINER ..... Librarian
MISS A. O. HALLETT ..... Assistant Librarian
W. O. STEWART, M.D. ..... Physician
MRS. M. CUNNINGHAM ..... Matron
MISS M. MONTGOMERY ..... Dietitian

ONTARIO AGRICULTURAL COLLEGE

AND EXPERIMENTAL FARM

1916

To the Honourable the Minister of Agriculture:

SIR,—I have the honour to submit herewith the Forty-second Annual Report of the Ontario Agricultural College and Experimental Farm, including the work of Macdonald Institute, for the year 1916.

THE SEASON.

Another year of war, with Britain fighting every day for Truth and Right!

The early part of the season—the growing season—being very wet, many field crops in Ontario were not planted, and the latter part of the season being very dry, many field crops were very short in production. Potatoes were practically a failure, and all kinds of grains were light. Corn was a very short crop, as were also the different varieties of roots. Hay was an abnormally large crop with good weather for curing, so that our live stock may be carried through the winter on this good hay alone.

Farm help has been very scarce because of the large number of men who have gone to the war, and the demand for unskilled labor in the factories and munition plants in our towns and cities. Never in Canada were unskilled laborers paid such high wages, and for this reason many good farm hands have left the country and gone to our towns and cities.

Our farmers, however, have worked early and late to secure the crop, and notwithstanding the adverse season, Ontario has come through very well.

It was remarked everywhere that the farms that were drained and well cultivated gave good average crops. Thorough cultivation always pays, for the difference between good and bad farming is shown more clearly in an adverse season.

ANOTHER YEAR OF WAR.

War and the ravages of war are in the minds of everyone. About the College, things are unusually quiet and peaceful. Practically all the students who are fit have volunteered during the past two years, and a few are slipping into uniform from time to time as their applications are accepted.

The Canadian Officers' Training Corps drills regularly twice a week. They are in uniform, and are preparing to do their "bit" if they should be required.

Wounded soldiers are returning from the front, among them some of our former students. Some return to their College work, but most of them hope to go back to the firing-line just as soon as they are fit. One man who lost his right arm is returning to England to act as Field Instructor during the continuance of the war.

The College has enlisted in all four hundred and forty-four men; of these thirty-eight have already been killed, or died of wounds.

In October last we were all greatly shocked to learn of the death of E. L. Davies of our Bacteriological Staff, who was killed in Flanders; he died leading his men in battle.

During the year the ladies on the campus have raised a Students' Comfort Fund and regularly supply all of our men with socks, caps, chocolate, tobacco, and other comforts. This has been much appreciated by the boys, whose letters are full of thanks for these welcome attentions.

Short Courses.

Again the short course work appears to be popular and to fill a distinct place in the farm activities. Young men and women who cannot leave the farm for any great length of time can, during the winter season, get away for a few weeks and improve their knowledge of some branch of agricultural work. We give separate, special courses in Stock and Seed Judging, Poultry Raising, Fruit Growing, Apple Packing, Bee-Keeping, and Dairying, and each year have quite a large number of students in each class.

This year the Department of Agriculture again sent to the Short Course in Stock and Seed Judging one hundred prize-winners. These boys had competed each in his own county in Acre Profit Competition, Feeding Hogs for Profit, Dairy Profit Competition, or Baby Beef Competition.

These young men averaged about twenty years of age, and seemed not only wide-awake but anxious to secure knowledge that would help them to improve farm conditions at home.

The course in Rural Leadership was continued and very much appreciated by those in attendance. Notwithstanding the extreme hot weather the programme was carried out to the letter and the results ought to be in some small measure at least an improvement in social life in such parts of the Province as were represented at this school.

The attendance at these short courses in 1916 was as follows:—

Dairy Courses	82
Stock and Seed Judging	201
Poultry Raising	23
Fruit Growing	43
Apiculture	55
Rural Leadership	24
Total	428

Stock Judging.

From our Senior Class is selected a team of five men each year to compete in stock judging at the International Live Stock Exposition held in Chicago in December. We do not select our team until just before the show, so that the entire class of senior students who are taking the agricultural option are given thorough instruction, and each man a chance to compete for a place on the team until the last moment. This year the following men composed the team:—

Evans, O. C., Chilliwack, B.C.
Fleming, R. R., Orton, Ont.
Martin, I. B., Bobcaygeon, Ont.
Skinner, A. G., St. Mary's, Ont.
Slack, P. B., Claremont, Ont.

The Winter Fair at Guelph was again a great success, and the following is a list of our students who were prize winners in the judging competitions:

Beef.	*Dairy.*	*Horses.*
A. Fleming.*	F. K. Merkley.	H. Clarke.
H. Clarke.	L. W. McKillican.	E. B. Goudie.
L. E. O'Neill.	A. H. White.	L. H. Hamilton.
C. Atkinson.*	C. Evans.	H. Earle.*
O. McConkey.	W. J. Austin.	E. J. Salter.

Sheep.	*Swine.*	*Poultry.*
E. V. Lawson.	L. G. Heimpel.	G. R. Wilson.
A. H. Musgraye.	W. Hawley.	F. L. Ferguson.
R. Templar.*	R. C. Elder.	H. W. Neff.
J. S. Steckle.	N. James.	R. W. Zavitz.
L. H. Hamilton.	W. F. Gardiner.	E. S. Snyder.

*Outsider.

In the Inter-year Judging Competition the classes ranked as follows:—

1st—Third year (Day Trophy).
2nd—Second year.
3rd—Fourth year.
4th—First year.

COLLEGE WORK AND PROGRESS.

We find that the war is affecting the attendance at the Agricultural College in about the same proportion as at other educational institutions. In our regular courses of two and four years the numbers are greatly reduced, while the attendance at the summer courses for teachers and the short winter courses for farmers has fallen away only slightly.

(Figures for general course include students of winter term and new students who entered for fall term.)

General Course	395	
Specialists in General Course Work	11	
Manual Training (One Year Normal Course)	9	
Dairy Course	82	
Stock and Seed Judging	201	
Poultry Raising	23	
Fruit Growing	43	
Apiculture	55	
		819
Domestic Science (at Macdonald Institute)		312
Summer Courses—High School—First year, 18; second year, 16	34	
Public School teachers, first year	112	
Public School teachers, second year	41	
School for Rural Leadership	24	
		211
Total		1,342

Analysis of College Roll (General Course), 1915.

From Ontario.

Algoma	2	Huron	5	Peterborough	7
Brant	4	Kent	5	Prescott	3
Bruce	7	Lambton	8	Prince Edward	3
Carleton	18	Lanark	3	Renfrew	4
Dufferin	2	Lennox	4	Russell	5
Dundas	3	Lincoln	9	Simcoe	11
Durham	7	Middlesex	17	Stormont	2
Elgin	8	Muskoka	3	Thunder Bay	3
Essex	7	Nipissing	1	Victoria	3
Frontenac	4	Norfolk	7	Waterloo	11
Glengarry	3	Northumberland	3	Welland	5
Grenville	8	Ontario	9	Wellington	26
Grey	4	Oxford	16	Wentworth	11
Haldimand	4	Parry Sound	1	York	42
Halton	4	Peel	8		
Hastings	7	Perth	6	Total from Ontario	333

From Other Provinces of the Dominion.

Alberta	3	New Brunswick	1	Saskatchewan	2
British Columbia	16	Nova Scotia	7		
Manitoba	1	Prince Edward Island.	6	Total from other Provinces	36

From Other Countries.

B. W. I.	1	Panama	1	South Africa	2
England	6	Scotland	2	U. S. A.	14
				Total from other Countries	26

Ages and Religious Denominations.

The limits of age in the General Course, 1915, ranged from 17 to 36 years. The average age was 22.

Anglican	71	Evang. Association	1	Methodist	130
Baptist	25	Friends	9	No Religion	5
Christadelphian	1	Greek Orthodox	1	Presbyterian	133
Congregational	3	Lutheran	2	Roman Catholic	10
Disciples of Christ	2	Mennonite	2		

New Buildings.

The Physics Building was completed during the year and makes a very substantial addition to our group of College buildings. It has been well furnished with new seating and laboratory equipment.

The Old Chemical Laboratory was, during the summer, very much torn to pieces, a new wing added, and the old laboratories enlarged. This has made practically a new Chemical Department, and has made it possible for our men to do better work in chemistry.

New Bulletins Issued During 1916 by the College Staff.

No. 235.—Sweet Clover (Melilotus). H. L. Fulmer.
No. 236.—Home Canning of Fruits and Vegetables. E. L. Davies.
No. 238.—Lime and Its Uses in Agriculture. Prof. R. Harcourt.
No. 239.—Potatoes. Dr. C. A. Zavitz.
No. 240.—Bacterial Diseases of Vegetables. Prof. D. H. Jones.

Changes in Staff.

The following have resigned and accepted other positions:—

J. E. Britton, B.S.A., Demonstrator in Horticulture.
C. M. Laidlaw, B.S.A., Demonstrator in Physics.
E. M. James, B.A., Instructor in Athletics.
Miss M. K. Rutherford, Dietitian.
Miss Mary E. McLennan, Demonstrator in Domestic Science.
H. Sproule, Demonstrator in Dairying.
P. L. Fancher, Resident Master and Instructor in English.
J. E. Simmons, B.S. in Agriculture, Demonstrator in Bacteriology.

The following men have enlisted:

G. J. Spencer, B.S.A., Demonstrator in Entomology.
W. H. Wright, B.S.A., Demonstrator in Botany.
T. H. Lund, B.S.A., Lecturer in Bacteriology.
J. P. Hales, B.S.A., Demonstrator in Poultry.

The following appointments or promotions have been made to fill vacancies:—

O. J. Stevenson, M.A., D. Pæd., Professor of English.
A. H. Tomlinson, Lecturer in Landscape Gardening and Horticulture.
R. J. Skelton, B.S.A., Demonstrator in Dairying.
R. Finkelstein, B.S. in Agriculture, Demonstrator in Bacteriology.
J. Woodard, B.S., M.A., Soil Investigations.
C. W. Stanley, B.S.A., Soil Investigations.
W. H. Scott, B.S.A., Demonstrator in Physics.
A. V. Mitchener, Resident Master and Instructor in English.
K. W. Forman, Instructor in Athletics.
Miss H. T. Job, Demonstrator in Laundry Work and Household Administration.
Miss N. M. Nixon, Demonstrator in Domestic Science.
Miss M. Montgomery, Dietitian.

WORK OF THE DEPARTMENTS

CHEMISTRY.

Soils.

We have been able to cover large areas in connection with our soil survey and now have the work completed in the district west of a line between Georgian Bay and Toronto. We hope to be able to print a map this year showing the distribution of the various types of soils over this area. Part of the soils have been sampled, and we had hoped to be able to give some data regarding the composition of these types of soils. However, the lack of laboratory space has prevented the work being carried out. We have not taken over any other land for actual demonstration experiments, but have placed experiments with reliable farmers where we keep control of the work done.

In connection with our demonstration plot on the light sandy soils in Norfolk County, it is gratifying to be able to report that although the season was a very dry one and that crops failed almost altogether in many sections, this light sandy soil produced a fair crop. On these plots we had potatoes and beans. The potatoes on the best plot yielded over 200 bushels per acre, which was about half of the yield got with the same crop in the adjoining range last year. Altogether, unfavorable as weather conditions were, the fact we wished to prove, viz., the suitability of this soil for growing potatoes has been again fully demonstrated. The

crops on our plots on the College farm, while not as large as we could wish for, were highly satisfactory and gave us further data regarding the manner in which this soil should be manured.

From the lime experiments we have some very interesting and instructive results, although the crops throughout the Province have been so poor as to render results of this year's experiments of comparatively little value. Another year's work of the survey has confirmed the conclusion we were forced to draw last year, that is, that large areas of our soils need lime, and it does seem as though the addition of lime to our soils must become very general if satisfactory crops are to be grown. Our clay soils especially need this constituent, and when it is pointed out that we have abundance of lime in almost every part of the Province suitable for agricultural purposes, it is evident that every means should be used to encourage the farmer to make the necessary application. In many parts of the Province farmers are having difficulty in getting clover to "catch" and remain in the soil. The clovers or legumes in general are lime-loving crops and cannot give their best results where this constituent is lacking. Our experiments this season confirm those of past seasons and lead us to *unhesitatingly recommend farmers to find out whether their soils are deficient in lime or not and to make every effort to get lime applied when it is necessary.* We would especially recommend the ground limestone rock on all heavy clay soils or on sour swamp soils. On these burnt lime will probably give better results. In buying ground limestone rock look carefully to the cost of hauling. Remember that one form of limestone is about as valuable as another, provided they are of the same degree of fineness.

ENTOMOLOGY.

Insects of the Season.

The unusual character of the weather during the year affected very materially the conditions of insect life. The very mild weather of January, followed by alternations of severe cold and mild days in February and March, was evidently a factor in the reduction of some of our injurious insects. The late spring and the cold and wet weather which continued until the end of June, followed by intense heat and drouth during July and August, had very great influence in preventing the increase of many of our common annual pests.

Cutworms, which had been so abundant and destructive in 1915, were hardly noticeable this year and no complaints came in from farmers reporting damage to crops. The abrupt changes of temperature in the winter may have proved fatal to hibernating larvæ, and the cold and wet of early summer retarded or prevented reproduction.

Aphids were the subject of more complaints than any other insect during the early part of the season. Cold, damp weather was very congenial to them, and they were found in vast abundance, sucking the life juices of a great variety of plants, shrubs and trees. The sudden change to hot dry weather at the beginning of July proved fatal to the colonies, and no more complaints regarding their ravages were received. The same weather conditions affected in a similar manner another insect which is seldom numerous enough to be a pest, namely, the Frog-hoppers or Spittle-insects, which live in a mass of spittle-like foam and suck the juices of the plant they infest. This year they were the subject of complaints and

enquiries from many parts of the Province, being especially abundant in pasture fields. A simple remedy is to cut down the affected grass or weeds with a scythe on a bright, hot day. The drying up of the plants at once cuts off the food supply and puts an end to the life of the insect.

Wheat-ears slightly infested with the maggots of the Wheat Midge were sent in at the beginning of August by the District Representative in the County of Elgin, who stated that the insect was quite prevalent in his neighborhood but had not done much damage. Many years have gone by since the Wheat Midge ceased to be one of the most serious pests on the farms of Ontario, and it is to be hoped that the present appearance of the insect does not portend a recurrence of this minute but very destructive midge. By sowing only selected varieties of "Midge-proof Wheat" and taking other precautions, such as burning all the chaff and waste from the threshing machine and deep fall ploughing, any repetition of the attack may be prevented.

Granary Weevils and other beetles that infest stored grain have caused serious losses to many farmers who have held over their stock of wheat, apparently in the hope of obtaining higher prices. These insects have also caused much trouble and expense in mills and storehouses. Constant watchfulness and absolute cleanliness of bins and other receptacles are required to put an end to an attack at the outset, and premises found to be infested should be fumigated or treated with the heat method; where practicable the latter has been found cheaper and safer than the use of poisonous gases, and quite as effective.

Among other insects which have been subject of complaint during the past season may be mentioned the Red-humped Caterpillar, which was unusually abundant on apple, plum and other fruit trees during the month of August; the Cottony Maple Scale on shade trees in Hamilton, Chatham, Walkerville and other places; and the Spruce Gall-louse, which is becoming a serious menace to the trees it infests. A small beetle (*Nomius pygmaeus*), which may appropriately be termed the "Skunk-beetle" from the intolerable odor that it emits, has caused great annoyance at several places in Muskoka; a single individual produces a stench that renders unendurable the atmosphere of any room to which it has gained access; fortunately it is by no means common, and but rarely makes its presence known.

The fifty-third annual meeting of the Entomological Society of Ontario was held in our class-room on the 2nd and 3rd of November and was attended by a considerable number of members from a distance, as well as by officers and students of the College. The papers read were of a high standard, and the majority of much practical value in connection with the control of injurious insects. The following contributions were made by this Department: "Dusting Fruit Trees and Grapes for the Control of Biting Insects and Diseases," and "Notes on Some Insects of the Season," by Prof. Caesar; "Preliminary Notes on the Use of Repellants for Horn-flies and Stable-flies on Cattle," by Mr. Baker. These will be published in the forthcoming annual report of the Society.

The following publications have been issued during the current year:—

By Prof. Caesar: "Lime-Sulphur Wash," revised edition of Bulletin 198; "Insects Attacking Grapes," in Bulletin 237 on "The Grape in Ontario"; "The Imported Willow or Poplar Borer or Curculio"; "Leaf-rollers Attacking Apples"; and "Insects of the Season in Ontario."

By Prof. Bethune: "Bibliography of Canadian Entomology for 1915," Transactions of the Royal Society of Canada: Biographical Sketch of Prof. H. H. Croft, D.C.L., in the Canadian Entomologist, vol. 48.

Investigation Work.

1. Pear Blight. This is now the fourth year's work in testing the practical control in orchards of this destructive disease. This year Mr. A. V. Mitchener, B.A., a third year O.A.C. student, was placed in charge of the work and, like his predecessors, carried out his duties ably and faithfully. He had under his supervision throughout the season about thirty acres of pear orchards, consisting of trees of all ages and of many varieties. The owner of each orchard paid, as last year, $1.75 per day for actual work done in control, but no charge was made for anything of a strictly experimental character. As a result of the prompt and intelligent method of treatment there was very little loss from the disease in any of the orchards under our control. In addition to his regular duties in these orchards Mr. Mitchener, in accordance with Prof. Caesar's instructions, gave advice and demonstrations of his method of control to any fruit grower who requested aid. Prof. Caesar intends to take full charge of the work himself next year, and to devote almost all his time to completing it, after which he will publish a bulletin on the practical control of pear blight in orchards.

2. Testing New Spray Mixtures. A careful and somewhat extensive test was made on apples, plums, cherries, peaches and grapes of the new method of treating diseases and insects by dusting them with a mixture composed of 85 per cent. very finely ground sulphur and 15 per cent. arsenate of lead powder. Wherever, as in the case of grapes, an insecticide was not required the arsenate of lead was omitted. The dusting was done by means of a blower driven by a 2½ h.p. gasoline engine. For the sake of convenience all the work was carried on in the Niagara district. The result on a block of ninety-two very large and much neglected apple trees was that at the time of picking an average of 97 per cent. of the fruit was free from scab, and a little over 90 per cent. free from Codling Moth. On a liquid sprayed plot in the same orchard where lime-sulphur and arsenate of lead paste were used, the result was an average of 99 per cent. of the fruit free from scab and about the same percentage free from Codling Moth as in the dusted area. Untreated orchards of the same varieties of fruit averaged from 40 to 50 per cent. free from scab and from 30 to 60 per cent. free from worms. It is thus clear that under Niagara district weather conditions the dust method of treating orchards gave almost as good results as the liquid spray, both on Apple Scab and Codling Moth, the two main orchard pests of the Province. The foliage on the dusted trees was more nearly perfect than that on the liquid sprayed trees. The dust spray required not more than one-eighth of the time to apply and, though a little trying on the eyes, was not nearly so unpleasant to use. It demanded, however, just as much intelligence and much more rapidity of movement on the part of the operator than the old method of spraying. On large apple trees the cost was less than that of the liquid sprayed, but on small trees was greater; the smaller the trees the larger the comparative cost.

It would be unwise from our own results to come to the conclusion that the dust spray would be satisfactory under all conditions, because reports from all other experimenters in the Province except one show that they did not obtain nearly so good effects upon the Apple Scab with this new method as with the liquid spray. There is no doubt that wet weather washes off the dust spray much more quickly. It will, therefore, be necessary to suspend judgment before coming to a decision as to the use of the dust spray on apples. We should perhaps mention here that a great drawback to the use of the dust is that up to the present time no really satisfactory substance has been tested that would completely control the San José

and Oyster-shell Scales when applied with the dusting machine, and therefore we have still to rely upon the liquid spray for the first or dormant spray by which these pests are combatted.

Upon cherries the dust gave as nearly as we could estimate the same results as the liquid lime-sulphur and as Bordeaux mixture, the trees sprayed with any of these being much freer from rot than the unsprayed trees.

On Lombard Plums, the only ones tested, good results were obtained in the control of the rot compared with the unsprayed check trees of the same variety.

On peaches no conclusion could be drawn as to the value of the dust as a controller of Brown Rot because this disease was almost totally absent even on unsprayed trees.

On grapes it controlled almost completely Powdery Mildew, both on the foliage and fruit, though several applications were necessary to effect this result. Unsprayed vines showed a considerable number of infested fruits and leaves. The effect on Black Rot of grapes could not be determined because there was almost none of this disease this year in any vineyard visited.

Calcium arsenate and soluble-sulphur combined were tested on apples, because it was claimed that no chemical action between these two substances took place and that there was therefore much less danger of burning the foliage than where arsenate of lead was combined with soluble-sulphur, since arsenic was freed here as a result of the chemical action. Our test showed that the new combination was not at all safe and cannot be recommended because more than half of the leaves were so badly injured on the sprayed trees that they fell, and in consequence the fruit was much smaller on the area treated with these substances than on any other part of the orchard.

3. Grape Leaf-Hopper Control. This year for the first time we were able to test in a thorough manner on badly infested vines the value of Black-Leaf-40 or of Nicotine-sulphate 40 per cent. on the Grape Leaf-hopper. We discovered that the spray should be applied about July 15th, because soon after that date the nymphs begin to become adults and in the latter stage could not be killed, also because every day allowed to pass after about that date meant much increase of the injury to the foliage, and because the rapidly growing leaves made the work much harder to do the longer it was postponed. If the spraying is well done so that the mixture is shot up from beneath and wets all the insects, the results that can be obtained are very satisfactory indeed, but this means the use of moderately coarse openings in the nozzles, good pressure and very careful work with the horses moving just about as slowly as they can. We used two nozzles on each rod and a pressure of 175 lbs. and the men sat on the back of the spray machine directing the rod with the utmost care and with great quickness.

Blue Grapes, so far as we could see, did not require treatment, or at any rate it was doubtful whether treatment would pay on account of the comparatively small number of insects on them, but the Roger Grapes or the red varieties in general were seen to be much more seriously infested, and judging from the last two years it would pay well to spray them with the tobacco extract. The proper strength to use is stated on the cans, though one may make it a little stronger than recommended there. The difference between sprayed foliage and unsprayed was very striking this year.

4. Apple Maggot or Railroad Worm. Mr. W. A. Ross, of Vineland, and Prof. Caesar continued this year their test of the value of spraying for this pest with sweetened arsenate of lead. The work was done in the neighborhood of

Brockville because satisfactory orchards could be found only in this district. The results were very satisfactory and we are now satisfied that the sweetened poison will, if properly applied at the right time, control this insect, at least in isolated orchards. It is planned next year to test the poison without the sweetening, as cage experiments and work elsewhere, as well as tests on Cherry Fruit-flies, seem to show that the sweetening is not necessary. If this is so, there will be considerable benefit, both because the molasses adds to the cost and because it makes the mixture much more easily washed off by rain than if the poison were used alone. We hope also to test dusting arsenate of lead upon the trees next year for this pest.

5. Fruit-tree Leaf-roller. This insect, whose life-history was worked out last year and whose larvæ it was found could not be controlled by arsenate of lead, does not seem to be increasing except in one orchard. On our advice the owners of two of the worst infested orchards in the Province tested this year the value of Scalecide—a miscible oil—against the egg masses. The spray was applied just before the leaf buds burst and the results showed that if well done Scalecide would destroy the eggs, but thorough work was necessary on the twigs to be sure that all the egg masses were wet with the spray.

6. Tree Protectors for Peach-borers. This year we tested the Scott Tree Protectors made in Baltimore, Md., which are intended to prevent Peach-borer larvæ from getting into the base of the trunk of peach trees. We regret that in our opinion these protectors will not prove satisfactory. We found that it was very difficult to put them on the trees so securely that in hot weather they would not become loose in one or more places and permit the larvæ to enter at these openings.

7. Peach Yellows and Little Peach. Our experiments on these diseases are beginning to give results. We have now proved that these diseases can be spread by budding healthy stock with buds from diseased trees, and also that a considerable percentage of pits from diseased trees will grow if they are properly attended to. We have had at least 8 per cent. grow. Our latest results show that though these do grow, yet the plants from them at the end of three years have not exhibited any signs of either disease. It may possibly be that disease will develop in another year, but it is not probable, and if the plants do remain healthy this will be good evidence that the danger from planting diseased pits which has been so much feared does not exist.

In all the townships in which the inspection has been done thoroughly for the last few years the number of diseased trees is still decreasing. In one or two townships very poor inspection has been done and there the trouble seems to be increasing.

8. Life-Histories. As part of the preparatory work for the publication of a bulletin on "Insects Attacking Fruit Trees" considerable time this year was devoted to working out certain points in the life-history of a number of insects that we have previously not been able to study sufficiently. Many photographs were made to illustrate the various stages of these insects and the nature of the injury done by them.

BOTANY.

Weeds.

Analysis of the correspondence received during the past twelve months indicates that the following weeds have given the farmers of Ontario most trouble during the past year: Twitch Grass (*Agropyron repens*), Field Bindweed (*Convolvulus arvensis*), Bladder Campion (*Silene latifolia*), Wild Mustard (*Brassica arvensis*), Ox-eye Daisy (*Chrysanthemum leucanthemum*), Perennial Sow Thistle (*Sonchus arvensis*) and Wild Carrot (*Daucus Carota*). Methods for keeping all these weeds under control are to be found in Bulletin 188, "Weeds of Ontario."

Fungus Diseases.

The prolonged cold, wet weather this spring favored the development and spread of certain fungus diseases. Others which usually cause serious loss were conspicuous by their scarcity, due to a large extent, no doubt, to the extremely dry weather of the summer months. Numerous enquiries, however, were received about a great many different kinds of plant diseases. Judging by the letters received the following were the most injurious diseases of the year: Peach Leaf Curl (*Exoascus deformans*), Apple Scab (*Venturia pomi*), Leaf Spot or Shot-hole Fungus of Cherry (*Cylindrosporium padi*) and Cane Blight of the Raspberry (*Coniothyrium fuckelii*). Reports were also received of the winter killing of cherries and raspberries. It is interesting to note that many of the cherry trees which did not survive the winter had been almost completely defoliated by Leaf Spot or Shot-hole Fungus the previous summer.

Purity Tests of Clover and Timothy Seed.

Purity tests according to the standards designated by the Seed Control Act were made of thirty-two samples of clover and timothy seed. Out of fourteen samples of timothy seed tested, four graded No. 1, one No. 2, six No. 3, and three were disqualified. Of eleven samples of red clover seed five graded No. 1, two No. 2, one No. 3, and three were disqualified. Out of seven samples of alsike seed one graded No. 1, two No. 3, and four were disqualified.

Diseases New to Ontario.

Two diseases which so far as we have been able to ascertain are new to Ontario were brought to our attention this summer. One is a disease which florists will do well to be on the look out for. *It is the rust of cultivated snapdragons.* The other is a *damping-off disease of young tomato plants,* which in wet springs such as the past (1916) appears capable of causing very serious loss to tomato growers. A brief account of both these diseases is included here; that dealing with the rust of cultivated Snapdragons was prepared by Dr. Stone.

Rust of Cultivated Snapdragons.

(*Puccinia antirrhini,* Diet. & Holw.)

Late in August of the present year, our attention was called to a disease of the Snapdragons in the College flower garden. Many of the plants showed marked symptoms of the disease, and before the end of the season over half of the plants

in one plot were dead, and the others in a very unthrifty condition. Upon examination the disease was seen to be the Snapdragon Rust due to *Puccinia antirrhini*. This is the first time this disease has been recorded in Ontario. Upon enquiry it was found that the plants which first showed the disease had been purchased from a florist in Toronto. Further, the florist had not grown them from seed, but had imported the small plants from the United States.

Symptoms. The diseased plants first show gray, blister-like patches on the leaves, and in a few days the blisters break and are filled with a powdery mass of brown spores. If the leaves are badly diseased the entire lower surface may become covered with brown powder. Later the disease appears on the stems. The plants gradually dry up and finally die.

Prevention. This disease has caused considerable loss and trouble to florists in some parts of the United States, and therefore the following suggestions are offered as to how it may be prevented from spreading in Ontario:

First.—When possible plants should be grown from seed. If they are imported, extreme care should be exercised to see that none of them are diseased.

Second.—Diseased plants should be destroyed.

Third.—In greenhouses plants should be watered from below in order to keep the leaves dry and thus prevent infection.

Fourth.—All foliage showing indications of the disease should be removed and burned.

Fifth.—Do not take cuttings from any plants showing the slightest indication of disease.

Bordeaux mixture, copper acetate and Fungine have been recommended as sprays for checking the spread of the disease. So far as our knowledge goes, however, spraying does not seem to be effective in preventing its spread.

Damping-off of Tomatoes.

In June a number of young diseased tomato plants were received from J. W. Noble, District Representative, Essex, Ontario. In the letter accompanying the plants Mr. Noble stated that thousands of late tomato plants in that district had been destroyed by the disease. A glance at the plants revealed brown lesions and constrictions on the stems near the surface of ground. Many of the plants showing these symptoms had fallen over, due to the collapse of the stems near the ground. These symptoms are typical of what are known as damping-off diseases. On examining the stems with a hand lens a white fungus growth was clearly discernible on the lesions. This, when examined under the microscope, proved to be the conidiophores of *Phytophthora infestans* (Mont.) De Bary. This is the fungus which causes Late Blight and Rot of Potatoes. It has several times been recorded as injuring the foliage and fruit of tomatoes but this, so far as can be ascertained, is the first record of it causing the damping off of tomato plants. This trouble is not likely to occur except in cold, wet springs such as the past, as it is well known that the fungus which causes it only develops and spreads to any extent during cold, wet weather. In such seasons it should be possible to hold it in check by thorough and repeated spraying with Bordeaux mixture.

Experiments to Control Late Blight of Celery.

Spraying experiments to control late blight of celery have now been conducted in co-operation with the Horticultural Department for four years. The first year both lime-sulphur and Bordeaux mixture were tested but, as the results of the first year's work indicated that lime-sulphur was not as effective as Bordeaux mixture in the control of blight, it was not used the two following years. This year, however, the high cost of copper sulphate, due to the war, made it almost imperative to find some substitute for Bordeaux mixture in the control of late blight of celery. It was, therefore, decided to make a comparative test of lime-sulphur, sulfocide and Bordeaux mixture for the control of celery blight. On account of the extremely dry summer celery blight did not develop to any marked extent even on the check rows, and consequently the results from spraying were not as marked as they have been in previous years. The rows sprayed with Bordeaux mixture and sulfocide were almost completely free from blight; the rows sprayed with lime-sulphur had some plants here and there with the leaves spotted with blight, and in the check rows nearly all the plants had some of the leaves spotted, and here and there in the rows small patches of plants were severely injured by the blight. No definite conclusions can be made from this one year's test of sulfocide, but the results indicate that this substance gives promise of proving a cheap substitute for Bordeaux mixture in the control of the late blight of celery. The results of two years' experiments show that lime-sulphur cannot be recommended for the control of celery blight. The results of four years' experiments show conclusively that loss from late blight of celery can be prevented by spraying with Bordeaux mixture (4-4-40 formula), starting when the plants are in the seed bed and spraying at intervals of ten days or two weeks throughout the growing season. The results of all the experiments emphasize the importance of starting to spray while the plants are in the seed bed.

Studies in the Life Histories of Fungi Causing Leaf Spot of Currants and Gooseberries.

This work was carried on by Dr. Stone, who gives the following account of it:

One of the forms under investigation was *Septoria ribis,* Desm., causing the leaf spot of currants.

By over wintering currant leaves bearing *Septoria ribis,* Desm., we have always obtained *Mycosphaerella grossulariae* (Fr.) Lindau. By planting these ascospores in agar a Septoria has been obtained, which is capable of infecting *Ribes nigrum, R. rubrum, R. grossulariae, R. cynosbati,* showing that the *Septoria* was *S. ribis,* Desm. Plants have also been infected directly with ascospores, further confirming this conclusion, and also showing that the ascospores are efficient in over wintering the fungus and starting the leaf spot disease in the spring.

Septoria aurea, E. & E.

Ribes aureum also is infected with a *Septoria* which has been described as a different species, *Septoria aurea,* E. and E. The diseased leaves often fail to produce the perfect stage of the fungus, the *Septoria* condition being maintained through the winter. However, a perfect stage is found and has been collected

and studied here. The perfect stage is sufficiently different from *Mycosphaerella grossulariae* (Fr.) Lindau, to warrant its description as a new species. The fungus has been described, and the name *Mycosphaerella aurea,* Stone, has been proposed.

Investigations of the Cause and Means of Control of a Peculiar Disease of Winter Tomatoes.

An account of this work was published in last year's College report. Another outbreak of the disease occurred at Simcoe, Ontario, and further investigations concerning its cause and control have been carried on during the past year. The results obtained are by no means conclusive. They are, however, worthy of consideration and have been briefly summarized by Dr. Stone as follows:

From further work steaming of the soil does not seem to be effective in preventing the disease.

The disease does not seem to be carried in the seed, as we have grown many plants from seed taken from diseased fruits without growing a single diseased plant.

We have been unable to isolate a causal organism, and have failed also in all attempts to inoculate healthy plants.

This work is still being continued in hopes of finding a solution of the difficulty.

Inspection for White Pine Blister Rust

The inspection work necessary for the prevention of the spread of this disease in Ontario has been placed in charge of E. J. Zavitz, Provincial Forester. At his request this Department made the necessary inspection of white pines and currants in this neighborhood. One infected pine was found and destroyed. No rust was found, however, on either cultivated or wild species of currants and gooseberries. This fact leads to the hope that possibly this most injurious disease of white pines may be exterminated from this district.

DAIRYING.

Home-made Rennet.

Owing to the scarcity and high price of rennet at the opening of the season 1916, much of the work done in the Cheddar cheese branch of the dairy related to home manufactured rennet and substitutes for rennet. Early in the spring we purchased fifty calves' stomachs from a Hamilton Abattoir Company and kept these in cold storage during the whole season, taking out stomachs from the salt as required from time to time. We were able to make a fair quality of rennet by soaking one or two stomachs in about one gallon of salt water for three days to a week. Various preservatives were also added to the rennet solution to aid in keeping it, as there is a tendency for it to spoil at ordinary room temperature. The yield and quality of the cheese were satisfactory by using the home-made rennet, but lack of uniformity in strength is one of the chief difficulties. Up to

the present we have found no method of standardizing the extract such as is done by rennet manufacturers. Our experiments prove that it is practicable to make rennet at home or at the cheese factory where a supply of calves' stomachs is available.

Rennet substitutes in the form of pepsin in scale and powder form, also in solution, have been tested with good results. Cheesemakers may be quite independent of rennet for coagulating milk in cheese manufacture if they have a supply of pepsin. What is known as "spongy" pepsin, a special brand for cheesemaking, can be highly recommended. This is manufactured by a Canadian firm, Parke, Davis & Co., Walkerville, Ont. A mixture of pepsin and rennet is preferable to the use of pepsin alone. A large manufacturer of rennet is now placing on the market such a brand of rennet, and cheesemakers will, of necessity, use in future some form of substitute for rennet, which is no longer available in sufficient quantity.

An American firm has furnished us with a special enzyme product, which has the property of coagulating milk. The results were quite satisfactory and almost equal to that got by using rennet for cheesemaking. The article is sold under a special trade name and at about half the present cost of rennet.

Experiments were made by using less than the standard quantity of rennet (3 oz. per 1,000 lbs. milk), as has been the tendency among some cheesemakers, in order to economize on rennet. In every case the smaller quantity of rennet caused a greater loss of fat in the whey and a less yield of cheese. Even though rennet may be high in price, cheese also is high in value; hence there is no economy in stinting the use of rennet in cheese manufacture. A mixture of rennet and pepsin is recommended where economy in rennet is necessary.

A continuation of former years' work in the pasteurization of milk for cheese making showed an increase of 5.6 lbs. cheese per 1,000 lbs. milk as a result of pasteurizing the milk, but we are not prepared, at present, to recommend this system for general use, because of the labor and expense involved in heating and cooling large quantities of milk, and because the cheese have not quite so good body and texture as when made from raw milk, although a recent report on New Zealand cheese by an English firm of importers says: "Cheese made from pasteurized milk stood the test of heat and delay of shipment better than that made from normal milk." We have found the use of five per cent. lactic culture in pasteurized milk more satisfactory than the use of hydrochloric acid.

The work in connection with the effects of varying percentage of fat and casein in milk used for cheese manufacturing was also continued during the year. These results agree with those obtained in other years, and show the inadvisability and unfairness of dividing money received from sales of cheese according to the weight of milk furnished by the patrons, when there is a variation in the percentages of fat and casein in the milk supplied by each patron.

Buttermaking.

The chief line of experimental work in this branch of the dairy was the testing of a number of makes of hand cream separators in the farm dairy with reference to the effects of speed, feed, temperature of milk and percentage of fat in the milk on the percentages of fat in cream and skimmilk, capacity of the machine, temperatures of skimmilk and cream, and ratio of cream to skimmilk.

The following are the main points brought out this year, and have a practical bearing on the operation of hand cream separators on Ontario farms, of which there are thousands in daily use all over the Province.

1. With one exception, variations in the speed of eight cream separators, from six revolutions of the handle per minute above, and below, normal speed had little effect except to cause a decrease on the percentage of fat (about 3 per cent.) in the cream when below normal, and an increase (3 per cent.) when above normal speed.

2. An increase in the temperature of the milk at the time of separating from 80 degrees to 90 degrees F. and from 90 degrees to 100 degrees F. had very little effect on results, except that the fat in the cream averaged about one per cent. lower, separating at 100 degrees, as compared with separating at temperatures of 80 degrees to 90 degrees F. This is contradictory to the results in 1915.

3. Variations of different depths of milk in the supply-tank of the separator from full, to one-half and one-quarter full, had very little effect on results, except that less than a full supply of milk in the supply-can tends to reduce the capacity of the machine about 20 lbs. per hour.

4. A variation from 3 to 4.1 in the percentage of fat in the milk separated had little effect, except that the milk containing the higher percentages of fat, averaging 3.8, produced cream testing an average of 31.3 per cent. fat, while milk averaging 3.1 per cent. fat, separated under similar conditions with eight different types of machines, averaged 26.3 per cent. fat in the cream. Rich, or high-testing milk, produces higher testing cream than low-testing milk, other things being equal.

From the foregoing we learn that the percentage of fat in the cream is likely to be most affected by varying conditions at the time of separating, and probably explains the wide variations in tests of cream as furnished by dairymen to creameries and cream-buyers.

We are not disposed to excuse careless or dishonest testing of cream, but our two years experiments with eleven different makes of machines in 1915, and eight in 1916, show that a variation in the percentage of fat in the cream is a usual result under varying and average conditions of operating a cream separator on the farm. The other results in separating milk are apparently not much affected when using modern cream separators operated under reasonably good conditions.

Churning tests comparing raw and pasteurized sour cream, showed a higher loss of fat in the buttermilk and a lessened yield, or "overrun," from the pasteurized lots. All our work on this question has given similar results, and point the lesson—that if cream is to be pasteurized, it should be delivered to the creamery in a sweet condition—have not over .25 to .35 per cent. of acid. In order to get this sweet cream, it will be necessary to pay a higher price for the sweet article. Butter made from pasteurized cream sells at from one-half to one cent per pound higher price than does similar butter made from raw cream. This extra price will more than pay the extra cost of pasteurization, but some butter-makers are doubtful about it paying for the extra loss of fat in the buttermilk, and compensating for the lack of quality in buttermilk for human consumption in the form of drink, hence the need of sweet cream, if pasteurized butter is to become general on Canadian markets or for the export trade.

Salting Butter.

Salting butter by dry, "ditch," and wet salting methods, gave similar results in moisture and salt content of the finished butter.

Salt added to the drained butter in the churn at the rates of 4, 5, 7, and 8 ounces per 100 lbs. butter produced finished butter containing 2, 2, 2.6 and 3.95 per cent. salt respectively. This butter, made in June, was held in cold storage until September 28th, when it was scored by Mr. Frank Herns. The lot to which 8 per cent. salt had been added was found to be "gritty," scored 42 out of 50 points for flavor, and a total of 87.5 points out of 100. The other lots were scored full for salt, and 44.5, 45 and 44 respectively in flavor for the lots having 4, 5, and 7 per cent. salt added, with total scores of 92.5, 92.5, and 92. The heavier salted lots were poorer in flavor after being held over three months in cold storage. These results confirm previous work in showing that salt is not a preservative of butter made from pasteurized cream. Most farm buttermakers add an excessive amount of salt to butter which is to be packed, thinking thereby to add to its keeping quality, and often the butter is altogether too salt for table use. If the cream be pasteurized the butter will keep as well salted lightly as with an excessive amount of salt and will be much more valuable.

It is claimed that one important cause of the non-keeping quality of butter packed on the farm, or at the creamery for cold storage purposes, is that of impure water used for washing the butter. Two tests were made during the past season to note the effect of "chlorinating" water used in washing butter, as compared with normal water pumped from the well at the dairy. This well is 180 feet deep.

FARM DEPARTMENT.

Farm Cost Accounting.

In April, 1915, there was commenced a system of Farm Cost Accounting for the following purposes:—

(*a*) To determine the cost of growing the different crops and live stock, and the financial results therefrom, on the College Farm.

(*b*) To evolve and perfect a system of farm cost accounting that can be applied to such work on different farms throughout the Province.

In April of 1916 a modification of the system used on the College farm, with the necessary means of reporting the requisite data, was applied to a number of farms in Ontario, with the view of further perfecting the system so as to make it applicable to different types of farms.

The data and information gathered from the first year's use of the system on the College farm produced some interesting figures. In the table which follows is found the cost of growing the various crops grown on the College farm during the season of 1915. These figures show, among other features, that the different hay crops, even with ordinary yields, can be grown from 30 per cent. to 50 per cent. cheaper than they could be bought, while oats and other grains, even with large yields, cost from 75 per cent. to 85 per cent. of what they could have been purchased for shortly after harvest. This emphasises the necessity, on a stock farm such as this, of devoting sufficient acreage to the growing of hay for feeding to the farm stock instead of producing too much grain, even if the yields are good.

COST OF PRODUCING CROPS ON THE COLLEGE FARM IN 1915

Crop	Acres	Rent of Land	Use of Bldgs.	Seed	Man labor	Horse labor	Use of machinery	Twine	Extra labor, threshing	Manure applied	Interest	Total cost	Value unexhausted manure and labor and seed	Value straw	Net cost	Total yield	Yield per acre	Cost per bushel or ton
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	Bushels	Bushels	$ c.
Barley	36	180 00	60 00	44 80	182 40	170 60	67 45	8 25	7 00	.....	20 00	740 50	.....	72 00	668 50	2,040	56.6	36⅛
Oats	16	80 00	32 00	25 60	96 80	79 35	31 37	5 52	3 50	3 00	9 84	366 98	.....	40 00	326 98	905	56.6	36⅛
Oats	20	100 00	40 00	34 00	94 67	78 58	31 07	4 40	4 38	.....	9 35	296 45	.....	65 00	331 45	1,132	56.6	29⅕
Oats	20	100 00	.....	32 00	99 81	97 40	38 50	4 45	17 15	27 75	12 38	429 44	13 87	32 00	383 57	991	49.5	38⅗
Oats	10	50 00	15 00	16 00	35 79	40 73	16 10	2 25	6 75	.....	4 63	187 25	.....	20 00	167 25	480	48.0	34⅝
Oats	40	200 00	60 00	64 00	189 81	206 51	81 64	9 95	28 50	.....	20 37	860 78	.....	100 00	760 78	2,600	65.0	29¼
Oats, all fields	106	530 00	147 00	171 60	516 88	502 67	198 68	26 57	50 28	30 75	56 57	2,240 90	13 87	257 00	1,970 03	6,108	57.6	32¼
Wheat	11	55 00	22 00	25 20	135 17	141 36	55 89	5 10	.....	.....	16 07	455 79	.....	32 00	423 79	550	50	77
Mangels	10	50 00	48 00	4 40	189 35	124 66	49 43	.....	.....	82 50	14 67	563 01	68 31	.....	494 70	10,540	1,054	4 7/10
Turnips	6	30 00	24 00	1 80	97 00	71 16	28 14	.....	.....	52 50	8 72	313 42	26 25	.....	287 17	2,860	476	10
																Tons	Tons	
Alfalfa	20	100 00	32 00	133 34	72 78	44 72	17 68	.....	.....	.....	13 42	413 94	66 67	.....	347 27	44¾	2¼	7 76
Clover	34	170 00	65 00	68 88	57 38	46 33	18 31	.....	.....	.....	6 36	432 26	.....	.....	432 26	66¼	1	6 53
Clover	22	110 00	30 00	46 20	40 17	21 61	8 54	.....	.....	.....	3 92	260 44	.....	.....	260 44	32½	1½	8 00
Timothy	40	200 00	55 00	.....	45 45	29 03	11 47	.....	.....	.....	2 86	343 81	.....	.....	343 81	52	1	6 61
Corn Silage	21	105 00	33 60	9 85	166 10	205 97	81 43	15 75	.....	156 50	15 94	792 14	136 83	.....	655 31	190	9	3 45
Corn Silage	18	90 00	28 80	9 82	153 87	169 74	69 11	13 50	.....	45 00	13 76	613 60	38 74	.....	574 86	135	7½	4 25
Corn Silage	11	55 00	17 60	5 01	90 45	112 12	44 33	8 19	.....	.....	6 50	339 20	.....	.....	339 20	77	7	4 41
" " all fields	50	250 00	80 00	24 68	410 42	487 83	194 87	37 44	.....	210 50	36 20	1,744 94	175 57	.....	1,569 37	402	8	3 90

METHOD OF COMPUTING COST OF HORSE LABOR.

	Costs.		Credits.	
1915				
Apr. 1	Inventory value of 15 farm horses	$2,965 00		
	Inventory value of feed and equipment on hand	899 05		
Aug. 15	51 tons, 1,985 lbs. hay at $12. (from Sec. 1)	613 90		
Dec. 1	9 tons straw at $4.00	36 00		
	8 tons straw at $5.00	40 00		
	3,510 bus. oats from fields 1, 2, 6, 7, 9 and 10	1,578 50		
1916				
Mar. 31	Bran for year	310 50		
	Drugs for year	18 50		
	Shoes and shoeing for year	115 57		
	Blankets for year	9 25		
	2 new horses	610 00		
	3,215 man hours (feeding, cleaning, etc., at 15 1-10c.)	485 47		
	Use of buildings	105 00		
	Interest on money invested at 5%	188 18		
		$7,974 92		
			Sale of 1 old horse	$43 00
			70 loads manure at 75c.	52 50
			131 loads manure at $1.00	131 00
1915				
May 1			Seed oats for 106 acres, 1915 (taken from feed charged horses on April 15th)	182 00
1916				
Mar. 31			Feed and bedding for 15 horses of other departments at $83.88	1,258 20
" 21			Inventory value of 15 horses	2,865 00
			Inventory value of feed and equipment on hand	798 30
			Net cost of horse labor for year	2,644 72
			Net cost horse labor $2,644 72	
			Total hours worked by horses 24,537	
			Cost per hour .10¾c.	
				$7,974 92

METHOD OF COMPUTING COST OF MACHINERY.

	Costs.		Credits.	
1915				
Apr. 1	Inventory value of farm machinery	$2,027 00		
July 1	2 new binders	260 00		
	1 corn cultivator	43 00		
" 10	1 Gurney scale	125 00		
Sept. 1	1 gang plow	32 00		
	1 blizzard cutting box	170 00		
Oct. 10	1 manure spreader	85 00		
1916				
Mar. 31	General repairs and oil for year	168 54		
	252 man hours (storing, repairing, etc. at 15 1-10c.)	37 95		
	71 horse hours (storing, repairing, etc. at 10¾c.)	7 63		
	Use of buildings	37 50		
	Interest on money invested at 5%	100 15		
		$3,093 77		
			1915	
			July 1 Sale of 2 old binders	$65 00
			1916	
			Mar. 31 Inventory value of machinery	1,979 00
				$2,044 00
			Net cost machinery for year	1,049 77
			As practically all machinery was used in connection with horses, the number of hours machinery was used is supposed to be same as hours that horses worked.	
			Net cost of machinery for year $1,049 77	
			Number of hours worked by machinery 24,537	
			Cost per hour 4¼c.	
				$3,093 77

Method of Determining Cost of Horse Labor and Use of Machinery.

The method of determining the cost of horse labor and use of machinery is explained in the tables which follow, and which are in reality the ledger accounts of horses and machinery, with the items summarized for the sake of brevity. This method of accounting insures that each crop, or farm operation, paid for its share of the cost of keeping the horses when idle, since the total cost of keeping the horses for the year was divided amongst the different crops in proportion to the number of hours they worked on each crop.

Summary of Year's Operations.

A summary of the whole business of the farm for the year, after eliminating all expenses for purely instructional and experimental purposes, taking credit for all labor and services rendered other departments of the College, and deducting the salary of a superintendent, the Farm proper paid all expenses and 2 1-24 per cent. interest on a total investment in land, buildings, live stock, machinery, and working capital of $97,697.26. Of the farm crops, with the exception of turnips, corn silage, and potatoes (which were a failure) all were grown at a profit. Of the live stock the sheep and swine each showed a profit after paying all expenses, interest, labor and housing of over 12 per cent. The dairy herd of 90 head, after paying for feed, bedding, service fees and other expenses, had $2,787.00 to pay for labor, interest and use of buildings, on an investment of $14,000.00. The beef herd, which is small, did not make quite as good a showing in the figures, though prices received at the sale later in the year disclosed that much too conservative an estimate was put on the increased value of the herd during the year.

The Dairy Herd.

All our pure-bred cows are entered in the Record of Performance as they freshen, and the herd record which follows is based on Record of Performance results.

It will be noted that the record of production never covers more than 365 days, but the cost of maintenance charged against each cow covers all the feed consumed during the time which elapses from the birth of one calf until the birth of the next. For example, take the first cow on the list, Young Springwood. Her record of milk and fat is for 365 days, but 452 days elapsed before her next calf was born, or 87 days over a year. It would not be fair, however, to charge her with the feed she consumed during these 87 days and give her no credit for the milk she produced during the same time, so that her product for the 87 days is valued and deducted from the cost of her feed for the 87 days. Thus the column in the table headed: "Net cost of feed from end of year to next calving," shows, in this case, that we have only $1.07 to add to the cost of the feed for 365 days. Some cows produced enough milk to more than pay for the feed consumed during this extra time, and this fact is indicated by a minus sign before the amount, but in the case of some cows, this extra charge materially reduces their profit for the year.

Name.	Breed.	Age.	Days in milk record.	Days between calvings.	Lbs. meal.	Lbs. silage.	Lbs. mangels.	Lbs. hay.	Cost of pasture.	Net cost feed from end of year to next calving	Total cost of feed.	Lbs. milk.	Lbs. fat.	Value of fat.	Value of skim milk.	Value of fat and skim milk.	Profit for year.	Profit with milk at $1.60 per cwt.	Return for $1.00 worth of feed.	Cost of 100 lbs. milk.	Cost of one lb. fat.
									$ c.	$ c.	$ c.			$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	c.
Young Springwood	Hol.	5	365	452	3,936	12,270	6,435	9,504	.....	1 07	133 19	20,110	821	278 12	38 57	316 69	183 50	188 57	2 38	66	16½
Molly Rue Rattler	"	3	365	390	3,852	11,200	4,920	8,778	.....	16	122 31	16,975	640	221 19	32 65	253 84	131 53	149 46	2 07	72	19
Blackie	G.H.	14	365	383	3,963	10,203	6,213	8,744	.....	3 46	127 01	17,011	636	219 05	32 75	251 80	124 79	145 16	1 98	74	20
Molly Rue	Hol.	6	365	386	3,658	11,170	6,310	8,964	.....	4 89	124 55	16,466	602	206 85	31 52	238 37	113 82	137 64	1 91	75	20⅝
Golden Rose	Sh.	8	365	407	3,333	10,164	10,298	2,453	5 07	6 79	103 47	12,395	560	188 21	23 79	212 00	108 53	94 85	2 05	83	18½
Toitilla Rue 2nd	Hol.	4	365	405	3,380	10,553	9,848	2,223	6 94	2 64	95 48	15,253	554	186 48	29 41	215 89	121 19	149 43	2 28	62	17
Margaret Cornucopia	"	10	365	455	3,924	11,375	6,850	8,736	.....	85	131 73	14,978	554	191 16	28 85	220 01	88 28	107 93	1 67	88	23⅝
Beauty of O.A.C. 3rd	"	5	364	394	3,094	11,240	8,338	2,502	5 07	4 61	91 32	14,808	535	175 95	28 59	204 54	113 22	145 53	2 24	61	17
Toitilla Rue	"	5	365	381	2,876	10,331	8,238	2,305	6 40	.....	80 59	14,041	513	173 61	27 13	200 74	120 15	144 22	2 50	57	15⅝
Barbara	G.H.	5	365	432	.....	.....	.....	.....	8 72	15 27	83 66	14,702	509	171 25	28 19	199 44	115 78	151 59	2 38	56	16½
Lady Maud	Sh.	8	365	730	2,353	8,952	8,308	2,130	8 72	30 00	106 24	11,891	506	170 99	22 78	193 77	87 53	84 02	1 83	89	21
Mercena Neth. O.A.C. 2nd	Hol.	5	365	403	3,408	10,867	9,448	2,553	6 94	2 64	95 48	14,515	483	159 88	28 05	187 93	92 43	136 77	1 97	65	19¾
Molly Rue 2nd	"	5	365	456	2,958	13,584	7,976	5,098	2 00	6 02	90 48	12,677	469	153 35	24 54	177 89	87 41	113 60	1 97	71	19½
Brampton Tapon	Jer.	4	365	731	2,087	6,022	5,725	1,712	6 82	10 16	67 55	7,428	417	142 46	14 02	156 48	88 93	51 29	2 32	91	16¾
Beauty of O.A.C	Hol.	12	365	457	3,813	11,427	6,167	9,124	.....	.....	130 85	13,178	416	141 99	25 54	167 53	36 68	80 00	1 28	99	31½
Fairy Duchess	Sh.	4	335	336	2,066	9,458	4,910	9,264	.....	.....	100 19	9,537	384	131 62	18 26	149 88	49 69	52 40	1 49	1 05	18½
Mercena Neth. O.A.C. 3rd	Hol.	3	348	365	2,051	7,738	5,500	1,710	7 19	.....	74 79	11,123	404	137 91	21 43	159 34	84 55	103 16	2 13	66	26
Brampton Dulcie	Jer.	5	362	422	2,541	7,456	6,450	2,083	9 10	9 30	79 42	7,913	382	131 26	15 06	146 32	66 90	46 19	1 84	1 00	20
Waterloo Baroness	Sh.	4	353	385	2,983	9,211	5,230	7,300	.....	.....	104 49	10,410	381	129 93	20 04	149 97	45 48	62 07	1 43	1 00	27
O.A.C. Minnie	Ayr.	6	365	532	.....	.....	.....	.....	.....	18 82	109 51	9,481	375	124 93	18 21	143 14	33 63	42 19	1 30	1 15	29½
O.A.C. White Rose	"	5	365	488	.....	.....	.....	.....	7 62	16 33	79 95	8,746	333	101 40	16 82	118 23	38 28	59 98	1 48	91	24
Merc. Rue Rattler	Hol.	3	261	261	1,489	4,578	3,290	1,060	7 19	7 00	49 07	8,188	324	108 54	15 72	124 26	75 19	81 94	2 53	60	15½
Flora Hope	Sh.	2	361	361	3,286	9,811	4,905	7,170	.....	.....	97 07	7,773	318	107 68	14 92	122 60	25 53	27 29	1 26	1 25	30½
Toitilla Rattler	Hol.	2	265	300	.....	.....	.....	.....	7 19	3 74	59 88	8,297	305	110 38	15 98	126 36	66 48	72 87	2 11	72	19½
O.A.C. Glennie	Ayr.	5	263	365	2,141	9,354	4,540	5,874	.....	11 83	92 55	7,423	300	95 86	14 24	110 10	17 55	26 22	1 19	1 25	30½
O.A.C. Dreamy	Jer.	6	313	380	1,817	5,538	4,685	1,678	7 96	1 29	56 26	5,075	298	103 81	8 75	112 56	56 30	24 94	2 00	1 11	18⅝
Brampton Reverencia	"	5	365	564	1,402	10,330	3,700	3,141	1 10	9 94	49 39	5,817	292	97 10	11 05	108 15	58 76	43 67	2 19	84	17
Bud's Minnie 2nd	Ayr.	2	340	364	1,224	5,904	1,690	1,334	7 19	.....	43 31	6,514	282	92 90	12 46	105 36	62 05	60 92	2 43	66	15½
College Toitilla Rattler	Hol.	2	356	363	.....	.....	.....	.....	7 00	.....	64 50	8,116	272	93 58	15 68	109 26	44 76	65 36	1 69	79	23⅝
Puddington Solo	Sh.	4	349	395	2,320	7,190	6,150	2,131	7 62	4 00	71 40	6,497	271	93 94	12 48	106 42	35 02	32 56	1 49	1 10	26½
Toward Point Ann	Ayr.	4	273	369	1,903	7,286	4,150	1,834	7 19	81	62 02	5,844	236	81 06	11 21	92 27	30 25	31 49	1 48	1 06	26½
Bar. White Soncie	"	4	237	365	1,519	6,964	3,400	2,478	7 19	.....	57 80	5,628	230	76 22	10 79	89 01	29 21	32 25	1 50	1 02	25
Floss Guarantee 2nd	"	2	365	390	1,388	6,190	4,110	1,296	7 19	3 10	51 73	4,944	187	64 28	9 51	73 79	22 06	27 38	1 43	1 04	28
Signal's Blend	G.	5	300	365	1,390	6,606	4,830	1,825	7 19	.....	50 36	4,285	183	63 25	8 20	71 45	21 09	18 19	1 42	1 18	27½

The charges for the different feeds in the table are as follows:—

Bran, $25.00 per ton.
Oil meal, $36.00 per ton.
Brewers' grains, $25.00 per ton.
Cotton seed meal, $30.00 per ton.
Oats, 35c. to 40c. per bushel.
Alfalfa hay, $14.00 to $17.00 per ton.
Clover hay, $10.00 to $12.00 per ton.
Silage, $3.34 per ton.
Mangels, $2.50 per ton.
Pasture in 1915—$1.50 to $1.87 per month.
Pasture in 1916—$2.00 per month.

The above feeds are at market prices for those purchased, and nearly market prices for those home grown. The charges for pasture include rent of land, seed and labor (man, horse and machinery) in preparing annual pasture, temporary fencing, and interest on working capital invested during year on above.

The prices for feed look low for present conditions, but they are the prices prevailing at the time the records were made.

Attention is especially drawn to the fact that the profit per cow shown in the table is merely profit above cost of feed. Rent, interest, wages etc. (except in the case of pasture), have not been taken into consideration.

Feed Cost of Producing Milk and Fat.

—	Days in record	Days between calvings	Lbs. Milk	Lbs. Fat	Cost of feed	Profit	Return for $1.00 worth of feed
9 COWS FED IN STABLE					$ c.	$ c.	$ c.
Springwood	365	452	20,110	821	133 19	188 57	2 38
Molly Rue Rattler	365	390	16,975	640	122 31	131 53	2 07
Blackie	365	383	17,011	636	127 01	124 79	1 98
Molly Rue	365	386	16,466	602	124 55	113 82	1 91
Margaret Cornucopia	365	455	14,978	554	131 73	88 25	1 67
Beauty of O.A.C.	365	457	13,178	416	130 85	36 68	1 28
Iford Fairy Duchess	335	336	9,537	384	100 19	49 69	1 49
Iford Waterloo Baroness	353	385	10,410	381	104 49	45 48	1 43
Flora Hope	361	361	7,773	318	97 07	25 53	1 26
Average of 9 cows	360	400	14,048	528	119 04	89 35	1 72
9 COWS PASTURED							
Toitilla Rue 2nd	365	405	15,253	554	95 48	121 19	2 28
Beauty of O.A.C. 3rd	364	394	14,808	535	91 32	113 92	2 24
Toitilla Rue	365	381	14,041	513	80 59	120 15	2 50
Barbara	365	432	14,702	509	83 66	115 78	2 38
Mercena Neth. O.A.C. 2nd	365	403	14,575	483	95 48	92 43	1 97
Mercena Neth. O.A.C. 3rd	348	365	11,123	404	74 99	84 55	2 13
Golden Rose	365	407	12,395	560	103 47	108 53	2 05
Puddington Solo	349	395	6,497	271	71 70	35 02	1 19
Brampton Dulcie	362	422	7,913	382	79 42	66 90	1 84
Average of 9 cows	360	400	12,361	468	86 23	95 38	2 10

PASTURING COWS VS. STABLE FEEDING.

For this comparison careful records were kept of nine cows which during the year were fed exclusively in the stable, being allowed outdoor exercise in a moderate sized yard; and of nine other cows from the main herd which were pastured during

the summer. The selection of the cows from the main herd was made with a view of obtaining cows which would show practically the same average number of days in milk, the same average number of days between calvings, and, as nearly as possible, the same average per cent. of fat in their milk.

The tables show that the average number of days in milk and of days between calvings are almost identical in the two groups; while the average per cent. of fat in the milk is 3.76 per cent. for the cows fed in the stable, and 3.78 per cent. for the pastured cows, so that the two groups may be said to be very evenly matched in these important points.

The method of arriving at the cost of feed and pasture is explained in connection with the record of the whole herd, which see.

The value of the product of these cows represents the total of the actual amounts received from month to month for fat, during the year, plus 20c. per hundred for skim milk.

Comments.—The comparison of these two sets of results show a striking advantage, so far as profit is concerned, in favor of the cows pastured during the summer.

The average production is in favor of the stable fed cows, but this is partially due to the manner in which the pastured cows were selected. In order to keep the average periods of lactation, days between calvings, and per cent. of fat, nearly alike for each group, some rather indifferent cows had to be included in the pastured group, but stable feeding is, no doubt, more favorable to large records.

The result may be summarized as follows:—

(1) Nine cows fed in stable showed an average annual record of 14,048 lbs. milk, and 528 lbs. fat, and produced a profit of $89.35 from $119.04 worth of feed, returning $1.72 for each $1.00 worth of feed consumed.

(2) Nine cows pastured during summer, of same lactation periods and same per cent. of fat as stable fed cows, showed an average annual record of 12,361 lbs. milk and 468 lbs. fat, and produced a profit of $95.38 from $86.26 worth of feed and pasture, returning $2.10 for each $1.00 worth of feed consumed.

Experiments With Swine. 1916.

During the past summer we repeated our comparison of tankage with skim milk for young pigs, and also compared the self-feeder with trough feeding.

For purposes of comparison we have valued feeds used as follows:—

Ground barley	$1 40 per cwt.
Wheat middlings	1 30 "
Skim milk	25 "
Tankage	2 64 "

These prices represent the actual cost to us of the feeds in question, but would need some revision to bring them up to date, but for purposes of comparing skim milk and tankage or of comparing the self-feeder with trough feeding the prices quoted are quite satisfactory.

Skim Milk vs. Tankage.

The following table brings out the principal facts in connection with the comparison of skim milk and tankage:

TABLE SHOWING WEIGHTS, GAINS, FEED CONSUMED, ETC.

Group	Average wt. June 29th	Average wt. October 2	Total Gain	Total feed consumed	Feed cost of 100 lbs. gain
I. 5 pigs—skim milk	49 lbs.	142.8 lbs.	459 lbs.	Wheat Middlings 596 lbs. Ground barley 346 lbs. Skim milk 3,697 lbs.	$4 75
II. 5 pigs—Tankage..	50 lbs.	144.2 lbs.	471 lbs.	Wheat Middlings 626 lbs. Ground barley 376 lbs. Tankage 110 lbs.	3 41

Tankage is a by-product of the large abattoirs and is an exceedingly highly concentrated feed. It should not constitute more than ten per cent. of the meal ration.

It will be noted that tankage at $2.64 per cwt. proved more economical to use than skim milk at 25c. per cwt. As a matter of fact the skim milk would have to cost less than 10c. per cwt. in order to give as cheap gains as the tankage mixture.

Possibly skim milk might make a better showing with pigs weaned at an earlier age, and this point will be tested further.

SELF FEEDER VS. TROUGH FEEDING.

In this test one group was fed dry meal from a self feeder and the other group was fed from a trough in the ordinary way. Each group received skim milk in addition to the meal, the self-feeder group being fed milk in a separate trough. The following table shows the principal points in connection with the comparison:

TABLE SHOWING WEIGHTS, GAINS, FEED CONSUMED, ETC.

Group	Average wt. June 29	Average wt. October 2	Total Gain	Total feed consumed	Feed cost of 100 lbs. gain
I. 5 pigs, self feeder.	46.8 lbs.	143.2 lbs.	482 lbs.	Wheat Middlings 664 lbs. Ground barley 411 lbs. Skim milk 3,697 lbs.	$4 90
II. 5 pigs, fed in ordinary trough	49 lbs.	142.8 lbs.	459 lbs.	Wheat Middlings 596 lbs. Ground barley 346 lbs. Skim milk 3,697 lbs.	4 75

It will be noted that the self-feeder pigs made a larger gain than the other group, but the cost of 100 lbs. grain was 15c. higher than in the group fed in the ordinary way.

The greatest difficulty we had with the self-feeder was to prevent waste, and there is little doubt that the higher cost was due to this waste of feed.

If large numbers of hogs were being handled the self-feeder would be a great labor saver, and might prove profitable to use from the standpoint of labor, in spite of the higher cost of gains.

ANNUAL SALE.

Our annual sale of surplus stock was held on October 26th and was decidedly successful.

Eight lots of Scotch Shorthorns sold at an average of $359.00 each. Fifteen head of Holstein cattle, including some small bull calves, made an average of $148.00 per head. Two fat steers sold at 14½c. and 11c. per pound, respectively. Thirty six young sows averaged slightly over $30.00 each, and a few grade cattle and sheep brought satisfactory prices. The total proceeds of the sale amounted to $7,725.15.

HORTICULTURE.

Fruit.

We demonstrated again this year that thorough spraying will produce clean apples, even in bad seasons. This result corroborates that of 1915 and as both were extremely wet, making spraying difficult and less efficient, we feel our results for these two seasons are noteworthy. We have harvested in both seasons crops of clean apples.

The strawberry crop this year on a 2½-acre plantation of seedlings was not as large as last year, but was nevertheless very satisfactory. We had quantities of berries which would go fifteen to a box.

Strawberries.

Plant Breeding. In the strawberry seedling work we harvested this year the second crop from a 2½ acre plantation consisting of over 7,000 seedlings, originally planted four feet apart each way, each seedling being allowed to make a good sized clump. Cultivation was kept up in both directions throughout in order to prevent runners getting mixed with other sorts. Three hundred and fifty-one plants were marked as specially desirable in the summer of 1915, and 300 of these were set out to form a new plantation in the spring of 1916. (There were about 50 plants which in the spring of 1916 did not appear to possess vigor or constitution enough to justify their being carried further.) The new plantation, consisting of 300 selected sorts, ought to prove most decidedly interesting next year and we hope to arrive at varieties of special value. We shall be ready to distribute a few plants for testing purposes in the spring of 1918.

Quantities of self-fertilized seed were saved from the best strawberry seedlings this season and a large number of second generation seedlings are being raised. It is quite probable that we shall find better material in the second generation than in the first crosses.

Apples.

In cross-bred apples we have about 2,000 two and three-year-old seedlings, made up principally as follows:—

McIntosh x Wagener, 77.
Wealthy x Wagener, 250.
Wealthy x McIntosh, 373.
Ontario x McIntosh, 500.
McIntosh x Ribston, 184.
McIntosh x Spy, 1,051.
McIntosh x Snow, 28.
Snow x McIntosh, 10.
Spy x McIntosh, 92.

We have been successful in raising from seed specially imported from Russia several thousand apple and pear seedlings which are intended for distribution for testing purposes throughout Northern Ontario. In this matter we hope to co-

operate closely with the Fruit Breeding Station recently established by the Department of Agriculture in co-operation with the Provincial Secretary's Department at the Reformatory Farm at Fort William. These will be ready for distribution in 1918.

In gooseberries we have a considerable quantity of seedlings under way, grown from the best English and native varieties, and we consider there is excellent scope for improvement in this fruit.

We are also carrying on breeding work with red and black currants, raspberries, cherries, plums and pears.

Vegetables.

We were successful in harvesting this year fair crops of vegetables in spite of the unfavorable season, the early part of which was very wet and the latter part of which was very dry. We demonstrated again this season the usefulness of overhead irrigation for vegetable crops. We consider that without irrigation our celery and other crops would have been a complete failure, whereas this year's crops are much better than last year's and almost up to normal.

Breeding Work in Vegetables. We are carrying on in this Department careful and systematic breeding work in the following vegetable crops:—

Beet.—Detroit Dark Red.

Cabbage.—Glory of Enkhuizen.

Carrot.—Chantenay.

Celery.—Paris Golden Self-Blanching, Winter King.

Lettuce.—Grand Rapids.

Onion.—Southport Yellow Globe.

Sweet Corn.—Golden Bantam.

We have produced in this Department seed of all these crops which is proving extremely satisfactory in trial tests.

The results of the experiments in celery show that our own strain of Paris Golden Self-Blanching compares very favorably indeed with the commercial seed. I may say that all seed of this variety has hitherto been grown in France, under the general belief that it could not be successfully produced in the United States or Canada.

Besides these we are working also with Asparagus, Rhubarb, Early Jersey Wakefield Cabbage, Copenhagen Market Cabbage, Tender Eight Weeks Cabbage, Big Boston Lettuce, Long Lost Lettuce and Spinach.

The intention is to further co-operate with Canadian growers of vegetable seed to the extent of placing in their hands the best strains of stock seed we can produce. In this work we are co-operating also with the Dominion Seed Division, through the active assistance of Mr. A. McMeans, Specialist in Field Root and Vegetable Seed Production for Ontario, under the Dominion Seed Division.

Home Production of Celery Seed. Seed of the green varieties of celery has been produced commercially in California for many years, but market gardeners have always insisted that seed of the self-blanching sorts must come from Europe. So far as we know, no attempts have been made to produce seed of these kinds in America. The following photographs demonstrate not only that seed can be produced, but that strains of that important variety, Paris Golden Self-Blanching, have been originated in this Department which will compare very favorably with the best foreign grown stock. Attention is called to O.A.C. Strains

114 and 415, the former of which has been thoroughly tested in our garden for two years, with the best results.

We have seed of this strain which we shall be glad to place in the hands of market gardeners for testing purposes, and we are particularly anxious to get in touch with growers who would like to follow up the excellent commercial opportunity which, we believe, lies in this particular line of seed growing.

The Testing of Canadian Grown Vegetable Seed. In order to acquire definite data as to the possibility of producing in Canada satisfactory stocks of vegetable seeds, this Department secured early in the year from the Dominion Seed Division the names of parties growing vegetable seeds and wrote them for samples for testing purposes. Most of the growers complied and the accompanying photos cover such results as are worth reporting upon at this time. Vegetable seed growing is a new industry in Canada, and as most of the stocks sent in for testing were produced by men new to the business, it is not surprising that some are inferior. The two crops here reported on (onions and parsnips) are not the most difficult to grow for seed, but the photographs will show that satisfactory stocks of these are now being produced at home. They show, also, that caution is necessary in this matter as some of the stocks being put out are so inferior as to be likely to give home grown seed a bad name, if generally disseminated.

Floriculture.

I have to report very keen interest on the part of the public in both ornamental branches of Horticulture, Floriculture and Landscape Gardening. In flowers we are specializing in hardy outdoor species and have now excellent collections of iris, pæonies, tulips, narcissus, roses and also a good general list of the best hardy perennials.

POULTRY.

One is quite safe in stating that there has never been a time when greater effort should be put forth by everybody to increase production. Every encouragement should be given to the people in villages, towns, and cities to produce what eggs they may need for home use in order that we may have more eggs for export. Now is Canada's opportunity to establish a name for good eggs in the British market, and, moreover, those of us who are not engaged in the war would be well advised to produce more and better eggs for our soldiers who are in the hospitals. Canadians are consuming more eggs each year, and unless production can be stimulated our exports can not grow, and considering that most people have enough ground about the back of their dwelling to keep a dozen hens, they should be encouraged to do so. Most dwellers in the towns and cities can easily spare the time to take care of the birds and supply home demands. The farmers are hard pressed for labor, and we must stimulate home production in the small towns, villages and cities even if the eggs actually cost as much as the price that they could be purchased retail. Our men are reported as fighting well and now we at home must bend every effort to produce equally as well.

The shortage of grain has caused many a farmer to sell pullets and young hens, and it may be that eggs this winter will be much higher than we expected. It is to be hoped that the culls have been sold and the good ones kept for next season's production.

The high prices of eggs annually during November and December, or in other words the shortage of production during these months, has for many years been an interesting study. One is frequently asked why more eggs are not produced during these months. The answer is not very hard for the reason that yearling hens seldom lay more than ten per cent. at this season, and pullets take from six to seven months to mature or begin laying. This means that May hatched chicks do not lay well until late December or early January. Hence there are but few birds in the Province that are ready to lay. Any person who is specializing in the poultry business will find it advantageous to hatch chicks in March and April. Our results of last year with Barred Plymouth Rocks show that during October, November, and December, March hatched pullets produced in the above months nearly thirty-seven eggs each; April hatched pullets twenty-one eggs each, while May hatched pullets probably less than nine eggs each, or taking the eggs at forty cents per dozen the cash value would be $1.23 for March pullets; the April pullets 70c. and the May pullets 29c. each. These figures suggest that here is at least one season of the year where competition in the special grade of eggs is not likely to be serious. Where one depends upon natural incubation the large crop of chickens will not be hatched before May. At this writing, for the chickens reared in 1916 the results are relatively similar. The two years' work on dates of hatching suggest March 20th to April 20th as being the most profitable dates to hatch chicks for the following winter layers. Earlier birds moult a little and later ones do not produce as great a percentage.

The price of eggs frequently drops rapidly about January 15th, which simply means that the May pullets are beginning to lay where they are reasonably well fed, etc.

The records for a series of years indicate that a hen producing one hundred eggs a year will pay for the feed consumed and the labor involved in caring for her These figures may vary a little from year to year but usually the price of eggs moves up and down in some sympathy with the price of feed. Of seven hundred pullets trap-nested last season over ninety-four per cent. of those completing a year in the pens produced more than one hundred eggs, and, moreover, of the hens that died from various causes about fifty per cent. produced one hundred or more eggs while living. It would appear that with a fair degree of intelligence very few farm flocks should be unprofitable.

A report would not be complete without some reference to the breeding work. The results show a gradual improvement. Last season the egg production increased more than usual. The results compiled to date show over thirty per cent. of the Plymouth Rocks produced two hundred or more eggs in twelve consecutive months, and what is more gratifying is that the percentage of poor producers is getting less. The size and color of the eggs have improved as has also the hatching power of the eggs set.

The amount of detail work is considerable and expensive but the results so far would justify the expenditure.

BACTERIOLOGY.

Cultures Sent Out for Legume Seed Inoculation.

A total of 2,166 cultures of legume bacteria for seed inoculation were sent out, made up as follows:

Alfalfa, 1,371; Red Clover, 443; Alsike, Vetch, Sweet Peas, Peas, Beans, White Clover, Sweet Clover, Crimson Clover, Mammoth Clover, 352.

Distribution of alfalfa by Provinces is as follows: Ontario, 803; British Columbia, 439; Saskatchewan, 49; Alberta, 60; other Provinces, 20.

Although no reports of results were asked for this year, many of our patrons sent in reports, all of which were favorable to the inoculation.

Lactic Cultures Sent Out.

A total of 113 lactic cultures and 22 Bulgaricus cultures were sent to creameries and cheese factories.

The following diseases and abnormal conditions were found in specimens submitted to us from all parts of the Province, for examination:

Poultry.

Apoplexy	1 pullet.
Acute rheumatism	Leg bones from cockerel.
Blackhead	Hen's liver.
Enteritis	7 hens, 2 cockerels.
Fowl cholera	1 hen.
Inflammation of lungs	1 pheasant.
Ovaritis	1 hen, 1 pheasant.
Over-feeding	5 hens.
Peritonitis	1 hen.
Poisoning	11 hens, 1 goose, 1 bantam, 1 pigeon, 4 ducklings, 4 chicks.
Roup	1 hen, 4 chicks.
Rupture of heart	1 pullet.
Rupture of oviduct	1 hen.
Scabies	1 hen.
Tuberculosis	11 hens.
Worms	1 pullet, 2 chicks.

Cattle.

Blackleg	Specimens from steer.

Human.

Tuberculosis	2 specimens examined. 1 positive 1 negative.

Swine.

Peritonitis	Growth from stomach.
Pneumonia	Portion of pig's lung.

Plant Diseases.

Blight canker of apple	1 specimen.
Bacterial soft rot of potatoes	3 specimens.
Crown gall of apple roots	1 specimen.
Crown gall of rhubarb	1 specimen.
Fire blight	1 specimen.
Twig blight of apples	2 specimens.

Milk Samples.

Bacterial counts made of numerous samples; nothing abnormal.
Ropy.....5 Ropy cream.....1

Water Samples.

Condemned for contamination.....14
Passed as fit for consumption..... 3
Bacterial count..... 1

Guinea Pigs.

Gastro enteritis.....2

Experiments in the Bacterization of Peat for Soil Fertilizing Purposes.

In an endeavor to substantiate the claims made by Prof. Bottomley of King's College, London, England, regarding the value of "humogen" (bacterized peat), as a soil fertilizer, we, in conjunction with the Chemistry Department, have carried on some experiments in the bacterial and chemical treatment of peat.

Bacterization of the Peat.

A sample of dry peat was divided into five lots and filled into large galvanized iron drums with perforated bottoms. The peat was then thoroughly worked up to aerate.

No. 1 was kept as a control.

Lime in varying quantities was added to Nos. 2, 3, and 4, no lime being added to No. 5.

Mixed soil-bacterial cultures growing in flasks of bouillon were then added to all samples except No. 1, to this a volume of water equal to the volume of bouillon was added. All samples were then thoroughly mixed and moistened with water and placed at a temperature of 25 degrees C. for a month, being thoroughly stirred up every few days.

Chemical analyses and bacterial counts of the peat were made before treatment, again after two weeks and after four weeks.

All samples were then heated in the autoclave at 15 lbs. pressure for one hour.

Rich cultures of Azotobacter, Pseudomonas radicicola and cellulose fermenting bacteria growing in Ashby's solution were then added to samples 2, 3, 4, and 5, and thoroughly mixed in and all were then placed at 25 degrees C. for two months.

Each sample was stirred up every week and water added sufficient to keep moist. Chemical tests and bacterial counts were made twice during this period.

Plant Growth Test of the Bacterized Peat.

A poor sample of soil containing much subsoil was obtained and divided into five lots. With this soil was mixed the five lots of bacterized peat, each in three different percentages: 0.5 per cent., 2.0 per cent. and 10.0 per cent.. Eight seven-inch flower pots were then filled with each mixture, and four of these were sown with radish, and four with lettuce seed. The lettuce germinated so poorly that no satisfactory deductions could be drawn from the test. The radishes, however, germinated well and later showed that with each increase of bacterized peat there was an increase of plant growth. After three months, from time of growing, the radishes were pulled and weighed, giving the following results:

AVERAGE YIELD OF RADISHES FOR FOUR POTS OF SOIL.

Peat—Lot 1	0.5%	peat.... 35.5	gms.
	2.0%	" 41.75	"
	10.0%	" 63.25	"
Peat—Lot 2	0.5%	peat.... 44.66	"
	2.0%	" 77.0	"
	10.0%	" 87.0	"
Peat—Lot 3	0.5%	peat.... 35.50	"
	2.0%	" 59.25	"
	10.0%	" 110.00	"
Peat—Lot 4	0.5%	peat.... 28.25	"
	2.0%	" 78.50	"
	10.0%	" 134.25	"
Peat—Lot 5	0.5%	peat.... 39.33	"
	2.0%	" 57.75	"
	10.0%	" 135.00	"

All plants from lot 1 (unbacterized peat, control) were small, poor and unmarketable.

Plants from lots 2, 3, 4 and 5 where 0.5 per cent. peat was added were mostly small, some of them being unmarketable.

Where 2 per cent. peat was added the results were good, the majority of radishes being of marketable size, and of good quality.

Where 10 per cent. peat was added the radishes were extra fine and large, and of good quality.

The addition of lime to the pest did not appear to have any beneficial effect, as lot 5 which had no lime added to it gave as good results on the whole as any of lots 2, 3 and 4.

It would appear from the above that the bacterial treatment to which this sample of peat was subjected was decidedly beneficial in making the peat useful as a fertilizer. Further experiments, however, are necessary to permanently establish this conclusion with regard to other samples of peat, and also as to whether it would be a practical paying proposition to treat large quantities of peat as a commercial undertaking.

FIELD CROPS.

On the seventy-five acres devoted to experiments in Field Husbandry, tests were conducted on about two thousand five hundred plots in 1916. Besides the plot tests in which definite yields were determined, there was a large amount of work in plant breeding including thousands of single plants which were special selections or crosses between different varieties.

POTATO PRODUCTION.

Within the past year a bulletin was issued from this Department on "Potatoes," copies of which are obtainable from the Department of Agriculture, Toronto, Ontario. This bulletin gave the results of upwards of forty distinct experiments conducted at the College, nearly all of which extended over a period of five years or more. In each of the past two years, potatoes have been imported from the Eastern Provinces, and from the Provinces and the States in the far West, in order to supply Ontario's requirements. In normal seasons, Ontario

should certainly produce enough potatoes to at least satisfy home consumption. The most of the soils of Ontario are very well adapted to potato production, providing they are properly underdrained, either natural or artificial. Some sections are particularly well suited to potato growing on a large commercial basis.

In each of five years, an experiment has been conducted at the College in testing, under uniform conditions, potatoes obtained from different sources. For instance, eighteen lots of Empire State potatoes were secured from eight different sources, five being from the Province of New Brunswick and three from Ontario. Seed potatoes grown about one hundred and forty miles north of Guelph in the Muskoka district near the Muskoka Lakes, have given a higher yield per acre than any of those from any other source in each of the five years of this experiment.

According to results of experiments which we have conducted, immature potatoes have a special value for seed purposes. These results probably explain how it is that the potatoes produced in a northern district usually give such excellent results when grown farther south in comparison with the seed produced in a longer season with more intense heat.

Although the crop of potatoes produced in Ontario in 1916 was very light, the potatoes are in nearly all cases unusually free from disease, and, although small in size, will probably furnish better seed for the coming spring than imported potatoes. There was a considerable amount of rot in the Maritime Provinces in 1916, as shown by the shipments which have been recently made to Ontario. The importations from the far West are also questionable for seed purposes.

To place potato production on a more substantial basis in Ontario, I believe it would be wise to develop seed production in the northern part of the Province; to grow only a few of the best varieties, such as the Empire State, the Davies' Warrior and possibly the Dooley of the late varieties, and the Extra Early Eureka or Irish Cobbler of the earlier kinds; and to form potato growers' co-operative associations based on sound and up-to-date business principles, and upon the loyalty and co-operative spirit of the members.

Varieties of Oats.

The value of the Ontario oat crop now amounts to about fifty million dollars annually. This is about one-quarter of the value of all the field crops grown in the Province, and slightly over one-half the value of the horses, cattle, sheep, lambs, swine and poultry of all classes, which are sold or slaughtered annually, and about double the value of the cheese and the butter manufactured in the factories and the creameries of Ontario each year.

Realizing the value of the oat crop to the Province, special attention has been given in breeding varieties which would give more satisfactory returns than those already in cultivation. About three hundred varieties have been imported from different countries, and carefully grown under uniform conditions in the experimental grounds. Efforts have been made to improve the best varieties by means of plant selection and by cross-fertilization. For fuller information regarding this work, the reader is referred to Bulletin 228 on "Farm Crops" issued in 1915, copies of which can be obtained from the Department of Agriculture, Parliament Buildings, Toronto.

Two varieties of oats started at the College have made excellent records both in our own trial grounds and in the co-operative experiments throughout the Pro-

vince. It is believed that the O.A.C. No. 72 variety of oats which requires the same length of time to mature as the Banner, will soon supplant practically all of the other varieties of late oats in the Province.

The O.A.C. No. 72 variety of oats was started from a single seed in 1903 and the O.A.C. No. 3 variety from a single seed in 1904. These two varieties have been carefully tested at the College with other varieties of oats in each of the past ten years. The following table gives the percentage of hull and the yield of grain per acre of the O.A.C. No. 3 and of the O.A.C. No. 72 in comparison with the Daubeney and the Banner varieties in each of the past ten years.

Years	Percentage Hull				Bushels per Acre			
	Early		Late		Early		Late	
	Daubeney	O.A.C. No. 3	Banner	O.A.C. No. 72	Daubeney	O.A.C. No. 3	Banner	O.A.C. No. 72
1907	24.7	24.7	28.3	27.2	80.79	86.29	65.94	76.38
1908	23.8	23.6	28.6	25.4	88.97	89.24	83.50	86.82
1909	25.4	24.8	29.6	28.7	98.35	104.88	70.41	102.94
1910	24.9	24.4	29.6	28.6	87.00	90.35	73.62	93.59
1911	26.2	25.0	31.3	27.8	42.12	49.76	30.41	43.97
1912	24.6	23.8	35.5	28.0	76.47	91.65	73.44	114.12
1913	24.5	23.0	29.2	25.6	60.41	94.12	74.38	105.74
1914	25.9	24.3	30.7	28.9	63.88	57.53	88.00	88.50
1915	23.7	21.7	29.1	28.4	73.21	76.00	92.76	103.53
1916	27.9	26.0	33.5	32.3	53.57	61.46	51.32	58.53
Average 10 yrs.	25.2	24.1	30.5	28.1	72.48	80.13	70.38	87.41

It will be seen that in almost every instance the O.A.C. No. 72 surpassed the Banner, and the O.A.C. No. 3, the Daubeney in both quality of grain and yield of grain per acre.

In the year 1911, the O.A.C. No. 72 variety of oats was first distributed for co-operative experiments throughout Ontario. One pound lots were sent in that year to three hundred Ontario farmers, who applied for the co-operative experiments with oats through the medium of the Experimental Union. The one pound of O.A.C. No. 72 oats was compared with two or three other leading varieties on plots one rod wide by two rods long. The new variety did so well in the first year that a large number of farmers saved their seed very carefully, and sowed it on larger plots in 1912.

In 1913, one farmer entered his O.A.C. No. 72 oats in the Field Crop Competition and took first prize. In 1914, twenty; and, in 1915, forty-eight first prizes were awarded by the judges for fields of O.A.C. No. 72 oats throughout Ontario in connection with the Field Crop Competitions. In comparison with the forty-eight first prizes taken by the O.A.C .No. 72 oats in 1915, thirty-three first prizes were taken by the Banner, and forty-five first prizes by all other varieties combined.

In connection with the Provincial Winter Fair held annually at Guelph, the O.A.C. No. 72 oats had five entries in 1913, thirty-six entries in 1914, fifty-seven entries in 1915, and seventy-one entries in 1916, and the Banner had twenty-one entries in 1916, and an average of twenty entries in each of the past five years. At the Provincial Winter Fair held in December, 1916, the O.A.C. No. 72 oats took first prize in the Field Crop Competition, open to all varieties of white oats, and took

the Championship Premium for the best oats at the Exhibition. The Championship bag of oats was sold at auction for eleven dollars.

An American seed firm recently changed the name of the O.A.C. No. 72 oats to that of Imperial, and sold the seed through agents in Ontario and in the United States for upwards of three dollars per bushel, when our farmers had thousands of bushels of first-class seed of O.A.C. No. 72 oats, which they were selling at from seventy-five cents to one dollar and fifty cents per bushel.

Varieties of Barley.

It is unnecessary to do more than to draw attention to the O.A.C. No. 21 variety of barley. This barley is now grown to the exclusion of nearly all other varieties. At the Provincial Winter Fair there were about forty lots of barley entered in each of the past two years but not one named variety was entered except the O.A.C. No. 21. The annual increase in the value of the barley crop of Ontario arising from the actual increase per acre, largely due to the introduction of better varieties, is about twelve times as great as the entire cost of the maintenance of the Ontario Agricultural College.

Mixed Grains.

Results of elaborate experiments in growing different kinds of grains separately and in combination are interesting. It has been found that a combination of one bushel by weight of Daubeney or O.A.C. No. 3 variety of oats and one bushel by weight of Mandscheuri or O.A.C. No. 21 barley will give fully two hundred pounds of grain per acre more than either grain grown separately. No single grain or combination of grains has given a higher yield per acre than the one here referred to. When these varieties are mixed and grown in combination they ripen at the same time, usually stand up well and produce a heavy yield of both grain and straw per acre, and form a good nurse crop for grasses and clover owing to the fact that they are early in ripening.

A New Winter Wheat.

In order to combine the most important characteristics and to eliminate the undesirable features of some of our leading varieties a considerable amount of plant breeding has taken place. Crosses have been made between the Dawson's Golden Chaff and some of the varieties of particularly high quality for bread production such as Tasmania Red, Crimean Red, Turkey Red, Buda Pesth and Imperial Amber. In the average tests for the last five years a cross between the Dawson's Golden Chaff and the Turkey Red has surpassed in yield per acre all the named varieties which were grown at the College. Crosses of the Dawson's Golden Chaff and the Tasmania Red have also made high yielding records within the past four years. A cross made between the Dawson's Golden Chaff and the Bulgarian has furnished a new variety, which in the last five years has surpassed both its parents in average yield per acre, and is almost equal to the Bulgarian in bread production. This variety was distributed over Ontario in connection with our co-operative experiments this autumn for the first time under the name of O.A.C. No. 104.

Hardy Alfalfa.

Rather elaborate experiments covering a number of years have furnished excellent object lessons in regard to the comparative hardiness of different kinds of alfalfa. The results of the experiments have shown that both the Ontario Variegated and the Grimm varieties of alfalfa have withstood our winter climate much better than nearly all other varieties. We are encouraging the growth of each of these varieties for seed production in Ontario. Through the medium of the District Representative and others, we have had about one hundred acres of Grimm alfalfa sown at the rate of three pounds of seed per acre in rows thirty inches apart with the definite object of seed production. Owing to the abnormal weather conditions of 1916, a comparatively small amount of alfalfa seed was produced in Ontario. One bushel of Grimm seed produced in Ontario was entered at the Winter Fair and took first prize and the championship, and was sold at the auction sale for thirty-one dollars and fifty cents, and changed hands the same day for forty dollars. If we have a good season for alfalfa seed production in 1917, there should be a considerable increase in Ontario's production of hardy alfalfa including both the Ontario Variegated and the Grimm varieties.

Production of Root Seed in Ontario

For the last eight or nine years, we have conducted experimental work in the production of the seed of mangels, turnips and carrots. The results of our experiments show that seed produced in Ontario, especially of mangels, is usually of very high quality. Our large supply of root seed was obtained from England, France and Germany previous to the war. We are now trying to encourage the growth of mangel seed in this Province, and, in the spring of 1916, distributed both seed and roots of our special selected strain of the Yellow Leviathan variety. We furnished in all about thirty-five thousand roots to about twenty-five interested farmers throughout the Province. Owing, however, to the abnormal weather conditions the yield of mangel seed in the past year was considerably below the average.

This short report, while touching only on a few lines of work which we are carrying forward, may prove of service, and give some indication of what the Field Husbandry Department is endeavouring to do in the upward progress of crop production in this Province.

MANUAL TRAINING AND FARM MECHANICS.

According to instructions received early in February, the manufacturers, who had placed implements and machinery on exhibition in Machinery Hall, were requested to remove their exhibits as the "Hall" was required for the accommodation of a large number of pioneering implements and domestic utensils, which had been received to form a nucleus for a museum of such historic relics. These are now labelled, and arranged in show cases in the "Hall." Early in May an additional donation was received from Mrs. Elena Moorehouse, of Lucan, consisting of the following:

Candle moulds; bake kettle, lid and triangle to set it on; scone baker for front of fire place; square gridiron—folding legs; graduating irons for crane;

hooks for crane; kettles for fire place; curlers; wooden boot jack; soldier's whiskey keg and bottles and belt; two sided axe; mule shoe, small; horse shoe; tongs; quarter kettle from kettle (small one); candle stick; candle holder for loom; Dutch oven; heather broom, handled; flails; hickory broom; sap yoke; long dinner horn; long-landled pan for fire-place; squirrels; reel; deer face and horns; gophers from North-West; two yokes and bows for same, boxed; two fire cranes; pair of fire-irons; horns of elk; shingle splitter; sap spile; iron kettle; 4 bells; pike-pole-iron for raising bents on barns; pair of stirrups and a pair of spurs, cavalry relics of 1812, J. C. Dorman, collected by Wm. Matheson; wooden trap; eye hinge for crane; grub hook; ladle and bullet moulder; horn, small; steel scale; cart saddle; boomerang; fossil; small iron scale; powder horn.

The J. Fleury's Sons, Aurora, donated their exhibit—a grain grinder, to the College, but the fanning mill of the Templin Manfg. Co., of Fergus, is still on the premises.

The instructional work of the Department has been carried out as detailed in the curriculum. The attendance during the year was:

Manual Training Students	11
First Year Agricultural Students	116
Second Year Agricultural Students	52
Macdonald Students	99

The four Normal students in Manual Training, who completed their course in June last, were Messrs. Chas. H. Arnold, appointed to Port Arthur; J. G. Chrysler, appointed to Fort William; R. H. Pomeroy and Wm. Everett Smythe, appointed to Toronto.

On August 1st, 2nd and 3rd, a special examination in Manual Training was held for instructors teaching on permits. Five candidates were examined and three passed.

THE TEACHING OF ENGLISH.

Prof. O. J. Stevenson, on the resignation of Prof. J. B. Reynolds, assumed the duties of Professor of English at this College. I have asked him for a report at this time, and his communication is given in full:

I wish at the outset to express my appreciation of the excellent organization of the English Department at the time when I assumed the duties of Professor. On every hand, I have found evidence of breadth of view, painstaking attention to detail and sound scholarship on the part of my predecessor, Professor Reynolds.

Needless to say, beginning my work, as I did, at the opening of the College year, I have been glad to accept the course of study as already drawn up, and to follow in detail the procedure of previous years. But although I have very little to report regarding the actual work of the past three months, it is perhaps worth while for me to forecast in a general way my policy regarding the work of the English Department for the future. It happens that I have begun work at a time when the whole question of the study of English in our schools and colleges is undergoing a close scrutiny by the general public as well as by experts in education; and in outlining any scheme of work in English for the Ontario Agricultural College, I cannot afford to disregard present day tendencies.

To begin with the subject of English literature—It has come to be recognized more and more in recent years that the chief object of teaching literature is not to give the student exercise in word-study and intellectual analysis, but to develop an appreciation for good prose and poetry.

The study of the author and the critical examination of his style has given place to an appreciative study of his works. And as a result of the effort to present the passage in literature in its most vivid form, there has arisen a demand for illustrative material. Fortunately for the teacher a large amount of such material is available, chiefly in the form of pictures and lantern slides; and in addition to this, by means of the phonograph it is possible to place before the class reproductions of some of the finest passages in literature as interpreted by the best artists. Thanks to your generous co-operation, we have, as you are aware, been able to add a phonograph to the equipment of the English Department; and I hope that in time it may be possible for us to purchase lantern slides and other material that will add to the effectiveness of the work in English.

In this connection also it is perhaps not out of place for me to express the opinion that the course in English in the Ontario Agricultural College should include some study of good music and good pictures as well as of prose and poetry. Literature is only one of the channels through which the great thoughts and feelings of the race have been expressed. In the work of school and college in the past the study of poetry monopolized the field, because no means existed by which masterpieces of music and painting could be presented to a class. Now, however, by means of the phonograph and the colored slide, it is possible to study these other forms of artistic expression. It is important, I think, that the young farmer should go out from the Ontario Agricultural College not only with an appreciation of the best literature, but also with a taste for fine pictures and good music.

In connection with the course of study and methods of teaching English composition, there are a number of problems to which I shall have to give attention during the coming year. In many of the Colleges in both Canada and the United States undue importance is, in my opinion, attached to the theoretical side of composition. In a college such as this, the course in English composition should provide such a training as will enable the student to express himself in clear and forcible English. With this end in view, it will be necessary for us to work out a systematic course in composition that will secure effective results without undue waste of effort on the part of the student.

Difference of opinion also exists among Agricultural Colleges as to whether students should be given work in composition related to their studies in Agriculture, or whether a broader course is best suited to their needs. I am gathering data on this subject, from other Agricultural Colleges, which I hope may be of some service to us.

There is no doubt that in the teaching of composition, by far the best results can be obtained from individual conferences, rather than by class teaching. But where there are only a few instructors and large classes, individual instruction is impossible. In the Ontario Agricultural College, where there is no entrance standard, wide variations exist between individual students. One of the questions to which I am now giving my attention, and which I shall endeavor to solve in consultation with the other instructors, is how best to reach the weak students so as to give them the kind of instruction they most need.

Hitherto, one of the great difficulties in teaching English composition has

been the question of how to get the student's work before the class in a form in which it can be criticized. Mr. Mitchener, who has charge of the first year composition, some weeks ago suggested the use of the reflectoscope as a means of throwing compositions on the screen. The experiment has been tried with marked success and I believe the use of the reflectoscope will go far towards removing one of the greatest obstacles in the way of effective class teaching.

As far as I am able to judge, effective work is being done in the classes in public speaking, and I have every reason to believe that the students derive both pleasure and profit from these classes. I shall, however, be in a better position to make a report on this division of the work after I have had more time to visit classes and go into details as to methods of teaching. In the meantime I am making an effort to improve the oral speech of the students throughout the College, by discussing with them at the beginning of each lecture period some one common error in their spoken language. In the course of the College year we shall in this way have covered a large number of these errors.

In conclusion, as a new member of the staff, may I be permitted to express my appreciation of the conditions under which the work in English is carried on in this College—the excellent library, class room and office accommodation, and, above all, the helpful co-operation of the staff and students, which has contributed so much to make my own work a source of genuine pleasure.

RURAL SOCIOLOGY.

Mr. A. Maclaren has handed in the first report of his work in Social Science in the Community. We print, herewith, his report in detail:—

Most of the work is in the nature of extension work and was executed outside of College.

I have given fifty addresses outside of the College, speaking at Shakespeare, Renfrew, Inwood, Morpeth, Chatham, Florence, Shetland, Kitchener, Woodstock, Beachville, Brooksdale, St. Paul's, St. Mary's, Norval. The subjects were all along the line of "Community Building and Community Builders." The total attendance at these meetings was about 4,200.

On one trip of two days 190 miles were covered, 22 rural schools addressed and 2 evening meetings.

I attended 12 short courses in Agriculture in Western Ontario during January, giving addresses on "Community Leadership" and "Play and Recreation," and demonstrating games suitable for country life. Twenty-nine addresses and 12 demonstrations in all were given with a total attendance of 1,430.

Two conferences were attended at London and Toronto Normal Schools at which the subject of "The Teacher's Relation to the Rural Community" was presented. The attendance was 375. Many teachers were enthusiastic over the results; so much so that I have been invited to help in putting on four Normal School Conferences this next winter.

A conference of four sessions was held with the Theological College students of Toronto, when the Country Problem was fully discussed. They will return to Guelph in January and confer with our students on "The Country Church and the Country Problem."

An address was given before the District Representatives' Conference on "Sports" which resulted in two athletic meets being held at Orono and Hampton.

Five athletic meets were arranged and conducted by myself during the summer at Petrolea, Auburn, Drumbo, Orono and Hampton. In all 550 boys and girls competed and the total attendance was about 5,500.

Social Survey.

Another phase of work carried out was the conducting of a Rural Social Survey in Drumbo community, Oxford County. Three hundred farm homes were visited, questionaires filled in, and the information arranged. This work involved six or seven visits to Drumbo—about three weeks steady at the work—and four or five addresses. As a result the community has been stirred. The District Representative says that it is more awake than it has ever been before. As direct tangible results of the survey a Farmers' Club has been started, a Play Day conducted, a Two-day Stock Judging Course held, a six weeks' Short Course arranged for and about 30 young men lined up for it, a Short Course in Domestic Science arranged for, delegates sent to Boys' Work Conference in Toronto, and last and best of all, a Drumbo Community Progress Committee formed representing churches, schools, Women's Institute, Farmers' Club and other organizations in the community which will work together to promote the welfare of Drumbo and the surrounding community.

Another survey has been arranged for and is now being made in St. George community in which all the ministers of the village are interested. This work also entailed five or six visits.

A series of four Presbyterian Church Institutes were attended, when "Community Building" was discussed. Total attendance, 600.

At the College a Conference on "Rural Health and Recreation" was conducted in February, and met with considerable success.

Summer School.

The second Summer School for Rural Leadership was held July 3rd to 14th. The total attendance was 45. These comprised ministers, teachers, Women's Institute members, etc. The school closed with everyone very enthusiastic and we have been hearing of good results ever since. This school is a feature that we cannot afford to let drop, because its popularity and service will grow from year to year. The students suggested that the time for it be shifted to the end of July and beginning of August.

At the same time we conducted the Play and Recreation for the Summer School for Rural Teachers. Our aim in the work was to develop the knowledge of and love for various games requiring little equipment and providing a maximum of interest. Every night was planned for and the work has resulted in many teachers actively engaging in the supervision and promotion of play in their own schools.

As a result of the last feature I was invited to give an address on and demonstration of "Play and Recreation for the Country School" at the following Teachers' Institutes: East Middlesex, West Lambton, East Elgin, West York and Perth County. In all 1,400 teachers were reached and inspired to promulgate the Gospel of Play from their schools.

Then considerable correspondence has been conducted regarding books dealing with country life, advising regarding particular situations and problems, and suggestions for conferences. In all twenty-one counties have been included in our correspondence besides correspondence with British Columbia, Alberta, Saskatchewan, Manitoba, Nova Scotia and Prince Edward Island.

In all this work we have served the following list of institutions, which, it will be noted, covers the whole range of community life and interests: Women's Institute, Eastern Ontario Dairymen's Association, Young People's Societies, Churches, Normal Schools, Epworth Leagues, Baptist Young People's Union, Teachers' Institutes, Ontario Sunday School Association, Ministerial Associations, Department of Agriculture, Schools, Theological Colleges, etc.

Over and above the above-mentioned work we have exercised supervision over College student organization activities.

Some of the Results.

One teacher writes that he is equipping a game room in a vacant room in his school and supervising play. At North Bay Normal School one of our students is instructing in games. Fort William High School, as a result of our work, introduced a new method of athletic competition and had 200 competitors instead of 30 as formerly. Smith's Falls High School is also adopting this method.

Twenty-five dollars was voted by a country school trustee board for play equipment as a result of one of our Play Days.

Five churches in one township have installed tennis Courts as a result of inspiration gained by one man at our Summer School. Papers on the Rural Church Problem have been presented at four conventions by students of our Summer School. All of them created considerable discussion. Requests have come from the Theological Colleges for courses in Rural Sociology. Two Country Church and Country Life Institutes have been conducted by students of ours. As a result of addresses we have heard of two places which are trying to create social centres, one in the school and the other in the library building.

These are only some of the results that might be mentioned. We are satisfied that rural Ontario is hungry for such leadership as a well equipped Department of Rural Sociology could give, and that there is much real research for such a Department to carry on.

HOME ECONOMICS.

Macdonald Institute Branches.

Our experiment in carrying our Short Course in Domestic Science to points outside the College was most successful. It was decided to offer similar courses as a regular part of our work and this year's calendar contains a full description of them. We have had two or three inquiries which have not yet resulted in Classes. This is perhaps not surprising since the women of rural Ontario who must organize the classes are fully occupied between war relief, increased production and decreased man-power. We believe there will be a good field for this branch work later, and the offer should be continued.

Women's Institute Work.

The work of helping Women's Institute members and others to prepare papers or speeches for their meetings by lending them material from our library and loan collection continues. Up to date this year we have had requests for information on:

Home interests	96
House and housekeeping	48
Food and cookery	90
Dietetics	13
Health	43
Household finance	31
Home economics, education	43
Social service, clubs, community work, etc.	116
Gardening and agriculture	18
Patriotic	16
Miscellaneous	13
	527

and the requests were answered with:

1,849 folders containing pamphlets, articles or clippings.
44 books.
5 special letters.
34 letters regretting that material wanted was lacking or already out on loan.
33 referred to Mr. Putnam or O.A.C. departments.

APPOINTMENTS OF MACDONALD INSTITUTE GRADUATES IN 1916.

TEACHERS.

	Class of	Appointed to
Miss J. Babb	1914	Macdonald College, Que.
" R. M. Black	1914	Public Schools, Swift Current, Sask.
" L. M. Cockburn	1915	Public Schools, Cornwall, Ont.
" J. Hamilton	1906	Home Economics Dept., Southern Methodist University, Dallas, Texas, U.S.A.
" O. Hayes	1915	Public Schools, Nelson, B.C.
" H. Hepburn	1914	Substitute Teacher, Macdonald Institute, O.A.C., Guelph, Ont.
" L. B. Isbister	1915	Public Schools, Saskatoon, Sask.
" H. T. Job	1912	Home Econ. Dept., Macdonald Institute, O.A.C., Guelph, Ont.
" H. McMurtry	1914	Normal School, Regina, Sask.
" A. B. Marcellus	1914	Public School, Vernon, B. C.
" M. C. Moxon	1916	Household Science School, Truro, N.S.
" G. Moyer	1916	Alma College, St. Thomas, Ont.
Mrs. Mary Oliver	1913	Technical School, Niagara Falls, Ont.
Miss W. Westcott	1915	Public Schools, Regina, Sask.

HOUSEKEEPERS AND DIETITIANS.

	Class of	Appointed to
Miss M. Campbell	1915	Galt Hospital, Galt, Ont.
" A. Currie	1914	Substitute, Homewood Sanitarium, Guelph.
" W. Downey	1915	Riverside Hospital, Toronto, Ont.
" E. H. Fearman	1912	Calydor Sanitorium, Gravenhurst, Ont.
" N. C. Goldie	1914	Wells College, Aurora, N.Y., U.S.A.
" P. Gray	1915	City Hospital, Hamilton, Ont.
" J. R. Hall	1916	Wells College, Aurora, N.Y., U.S.A.
" H. P. Henderson	1916	Hurley Hospital, Flint, Mich., U.S.A.
" E. Hopkins	1916	General Hospital, Guelph, Ont.
" H. Jacques	1915	Hospital for Insane, North Battleford, Sask.
" E. M. Lees	1914	City Hospital, Regina, Sask.
" R. MacAdams	1911	Orpington Hospital, Orpington, England.
" L. McLellan	1916	Strathcona Hospital, Edmonton, Alta.
Mrs. MacPhayden	1916	Bellevue Hospital, New York, U.S.A.
Miss C. S. Martin	1915	McKay Institute, Montreal, Que.
" E. Master	1916	General Hospital, Fort William, Ont.
" S. Milton	1915	Y.W.C.A., Kingston, Ont.
" M. Montgomery	1915	O.A.C., Guelph, Ont.
" L. Panton	1915	Queen's Hall, Toronto, Ont.
" F. M. Reek	1916	Victoria Hospital, London, Ont.
" B. Seaborn	1911	Western Hospital, Toronto, Ont.
" M. Smith	1915	Wells College, Aurora, N.Y., U.S.A.
" K. Stevenson	1916	University of Saskatchewan, Saskatoon.

WOMEN'S INSTITUTE DEMONSTRATION-LECTURERS.

Miss C. Black ..... 1915 Miss M. Foote 1915

MACDONALD INSTITUTE GIRLS AT WAR WORK OVERSEAS.

Some of Macdonald Institute's old students are overseas doing war work. Doubtless other names should be in the following list, but we have not heard of them.

HAVING OFFICIAL APPOINTMENTS.

Miss Eva Beard—Short Course in 1911, is a graduate nurse and somewhere in England.
" L. Creelman—Associate 1912-14, in Canadian Red Cross Headquarters, Boulogne, France.
" Carrie Green—Homemaker, 1909, is a graduate nurse and a nursing sister in Orpington Hospital, England.
" Agnes Hastings—Homemaker, 1907-08, is a Home Nurse in a hospital somewhere in France.
" Roberta MacAdams—Normal, 1909-11, is a nursing sister (Dietitian) in Orpington Hospital, Orpington, England.

DOING WHAT THEY CAN IN HOSPITALS, ETC.

Miss Isabel Saunders—Homemaker, 1909-10, in England.
Mrs. Gladys Caverhill Hoyt—Normal, 1910-11, in England.
Miss Meta Bankier—Homemaker, 1905-06, in England.
" Leah McCarthy—Homemaker, 1915-16, in England.
" Phyllis Slater—Short Course, 1916, in England.

LIST OF GRADUATES FROM HOME ECONOMICS COURSES IN 1916.

Graduates of the Normal Course in Domestic Science:

1. Miss Chryssa L. Black .....64 Glasgow Street, Guelph, Ont.
2. " Helen L. Easton .....Leamington, Ont.
3. " Margaret E. Hopper .....Cookstown, Ont.
4. " M. Lillian Macdonald .....Sherbrooke, N.S.
5. " Mary C. Moxon .....Box 392, Truro, N.S.
6. " Grace I. Moyer .....57 Howitt St., Guelph, Ont.
7. " Minnie Ramage .....Clarence, Ont.
8. " Mabel E. Rumball .....166 Main St., Niagara Falls, Ont.
9. " Annie P. Scott .....Nottawa, Ont.
10. " Mary N. Scott .....Bervie, Ont.
11. " Eleanor M. Smith .....Box 95, Truro, N.S.
12. " M. Beatrice Watson.....50 Ominica St., Moose Jaw, Sask.
13. " Marjorie H. Williams .....Jarvis, Ont.

Graduates of the Housekeeper Course:

1. Miss Frances Allan .....253 Waterloo Ave., Guelph, Ont.
2. " Jessie R. Hall .....R.R. No. 4, Bright, Ont.
3. " Henrietta P. Henderson .....Blenheim, Ont
4. " Edith Hopkins .....R.R. No. 1, Lindsay, Ont.
5. " Jean M. McIlquham .....Lanark, Ont.
6. " Alicia W. Murray .....58 Ontario St., Stratford, Ont.
7. " Florence M. Reek .....Blenheim, Ont.
8. " Kathleen Stevenson .....Orangeville, Ont.

Housekeeper Students of Other Years who Completed the Course in 1916:

1. Miss Marion S. Hill .....Liverpool St., Guelph, Ont. (1913-15)
2. " Susan G. Milton .....R.R. No. 1, Kingston, Ont. (1913-15)
3. " Jessie E. McGee .....Belleville, Ont. (1909-11)

Graduates of the Associate Course:

1. Miss Frances Beven ..... Ancaster, Ont.
2. " Edith F. Grenside ..... 115 Norfolk St., Guelph, Ont.
3. " Marguerite C. Stewart ..... Abernethy Apts., Toronto, Ont.
4. " Janet O. Story ..... Crossdoney, Guelph, Ont.
5. " Nellie Wells ..... 368 Victoria St., Toronto, Ont.

Graduates of the Homemaker Course:

Class C.

1. Miss Mary Baillie ..... Simcoe, Ont
2. " Margaret Blake ..... Toronto, Ont.
3. " Reba A. Campbell ..... Hamilton, Ont.
4. " G. Eardley Greene ..... Toronto, Ont.
5. " Emmeline McAllister ..... Guelph, Ont.
6. " Vera L. Mulveney ..... Montreal, Que.
7. " Reita S. Penhorwood ..... Sault Ste. Marie, Ont.
8. " Helen Turner ..... Little Current, Ont.
9. " I. Doreen Wilson ..... Sault Ste. Marie, Ont.

Class A.

1. Miss Jean D. Bell ..... Chesley, Ont.
2. " Phyllis A. Buck ..... Brantford, Ont.
3. " Marjorie L. Davis ..... Neepawa, Man.
4. " E. Eileen Harvey ..... Montreal, Que.
5. " Margaret Kingsboro ..... York, Ont.
6. " Elizabeth B. Lineham ..... Vancouver, B.C.
7. " Elma M. Lineham ..... Vancouver, B.C.
8. " Victoria M. Marsh ..... Lindsay, Ont.
9. " Marian E. Shannon ..... Sault Ste. Marie, Ont.
10. " Jennie C. Stewart ..... Chesley, Ont.
11. " Kathleen F. Trotter ..... York, Ont.
12. " Mary Tyrrell ..... Toronto, Ont.
13. " Adah Wells ..... Toronto, Ont.
14. " Doreen S. Woodyatt ..... Brantford, Ont.

Class B.

1. Miss Madeline J. Houston ..... Hawkestone, Ont.

SUMMARY OF ATTENDANCE IN 1916.

A.—January to June, completing the College year 1915-1916.

1. *Normal Domestic Science:*
   - (*a*) Juniors 11
   - (*b*) Seniors 14
2. *Associate:*
   - (*a*) Juniors 12
   - (*b*) Seniors 7
3. *Housekeepers:*
   - (*a*) Juniors 9
   - (*b*) Seniors 8
4. *Homemakers* 42
5. *Short Course in Domestic Science:*
   - (*a*) Winter term students 26
   - (*b*) Spring term students 19
6. *Optional* 2
7. *Student-workers* 4
8. *Public School Students* 43

B.—September to December, opening the College year of 1916-1917.

1. *Normal Domestic Science:*
   - (*a*) Juniors 15
   - (*b*) Seniors 11
2. *Associate:*
   - (*a*) Juniors 12
   - (*b*) Seniors 8

3. *Housekeepers:*	
(*a*) Juniors	12
(*b*) Seniors	8
4. *Homemakers*	31
5. *Short Course in Domestic Science:*	
(*a*) Winter term students	12
6. *Optional*	1
7. *Student-workers*	2
8. *Public School students*	36

C.—Students counted in both above lists:	
1. *In long courses*	30
2. *In Public School classes*	3
D.—Total number of students in 1915	390
Total number of students in 1916	312

NOTE.—The smaller total of 1916 is partly due to war conditions, but also to the fact that we have had no Outside Branch Course, fewer Guelph students, and that we are using three instead of four public school classes for practice teaching.

DEGREES AND DIPLOMAS IN AGRICULTURE.

The following students graduated in 1916 with the degree of Bachelor of the Science of Agriculture (B.S.A.).

Abraham, R. H., Chatham, Ont.
Amos, Loyal, Box 125, Guelph, Ont.
Archibald, John G., Upper Stewiacke, N.S.
Atkins, Eric Wm., Box 684, E. Lansing, Mich.
Baird, Alfred Briggs, Box 381, Fredericton, N.B.
Bennett, Wilbur, 53 Crescent St., Peterborough, Ont.
Binkley, Harold V., 30 Ontario Ave., Hamilton.
Brownridge, J. W., Brandon, Man.
Bryden, Russell Jas., 880 Hellmuth Ave., London, Ont.
Burrows, Alvin Robt., Guelph, Ont.
Carncross, Elmer E., Cloverdale, B.C.
Chisholm, W. M., Loch Lomond, C.B.
Clark, Geo. Alvin, Poole, Ont.
Coke, Joseph, Erin, Ont.
Cotsworth, Frank B., 231 Seventh St., New Westminster, B. C.
Coughlan, Michael H., Hope River, P.E.I.
Culp, Ernest, Vineland Station, Ont.
Dougherty, J. L., Pembroke, Ont.
Duncan, Chas. C., Jordan Harbour, Ont.
Ferguson, Clarence D., Valetta, Ont.
French, Herbert S., Vernon, B.C.
Glavin, J. G., 124 Vernon St., Worcester, Mass.
Hill, Wm. H., 9 Langham St., London W., England.
Hogan, Everett, Hope River, P.E.I.
Jackson, Geo. H., Guelph, Ont.
Johnston, J. T., Navan, Ont.
Lackner, Clarence E., Chesley, Ont.
Langley, Ben., 73 McTague St., Guelph, Ont.
Macdonald, W. P., New Lowell, Ont.
Martin Norman R., Springfield, Ont.
McCulloch, John H., New Abbey, Kirkcudbrightshire, Scotland.
McDermott, A. M., Elmvale, Ont.
MacIntosh, Jas. M., West River, N.S.
McLarty, John E., Rodney, Ont.
McLennan, Donald M., Box 19, Lancaster, Ont.
Reilly, Edw. E., R.R. No. 4, Spencerville, Ont.
Romyn, Anton E., Box 75, Pretoria, S. A.
Schuyler, Delbert, Box 166, Brantford, Ont.
Scott, H. M., Abbotsford, Scotland.
Scott, W. H., R.R. No. 4, Norwood, Ont.
Shaw, Walter R., Clyde River, P.E.I.
Small, Ervin Leslie, Wallacetown, Ont.
Skelton, Robert J., R.R. No. 6, Tavistock, Ont.
Steckle, H. S., R.R. No. 2, Kitchener, Ont.
Stothers, Stephen B., Mafeking, Ont.
Strong, Wm., Guelph, Ont.
Varey, John M., Rocklyn, Ont.
Walsh, Frederick Wm., 3 Grove Gardens, Isleworth, London, Eng.
Welton, Kenneth, 59 Benlamond Ave., E. Toronto, Ont.
Wilson, J. Ruthven, 582 Huron St., Toronto, Ont.

First student to graduate from the O.A.C. with the degree of Bachelor of Science in Agriculture, B.Sc. (Agr.).

Foulds, F. E., 58 Fuller Ave., Toronto, Ont.

Recipients of Associate Diplomas, 1916.

Andrew, John F., Lucknow, Ont.
Ames, Geo. A., 387 Kingston Rd., Toronto. Ont.
Arnold, George J., 206 Victoria Rd., Old Charlton, Kent, Eng.
Binkley, Harold V., 30 Ontario Ave., Hamilton, Ont.
Bremner, Jas. A., Ethel, Ont.
Brown, Allan T., R.R. No. 9, Peterborough, Ont.
Brown, Wm. Raey, 83 Silver Birch Ave., Toronto, Ont.
Brown, Ralph W., Summerland, B.C.
Clare, Fred, McAlpine, Ont.
Coke, Joseph, Erin, Ont.
Cooper, Thos., R.R. No. 1, Wallenstein, Ont.
DeLong, Geo. E., Rossmore, Ont.
Davis, Henry Roy L., 69 Forbes Ave., Guelph, Ont.
Dodding, David, Lower Nicola, B.C.
DuToit, Alphonse G. S., De Wet St., Worcester, S.A.
Edgar, Jas. D., 118 Yorkshire St., Guelph, Ont.
Ferguson, Fred L., Parkhill, Ont.
Finch, John, Aughton, Lancashire, Eng.
Gardiner, W. F., Sarnia, Ont.
Geddes, Wm. F., Kinburn, Ont.
Griffin, Robert J., R.R. No. 1, Sarnia, Ont.
Hammond, Wm. A., Port Dover, Ont.
Hamilton, Lionel H., Arthur, Ont.
Heimpel, Louis C., R.R. No. 2 Petersburg, Ont.
Henry, Chas. W., Thornton, Ont.
Hoard, Chas. W., R.R. No. 3, Stirling, Ont.
Honey, Geo. L., Port Perry, Ont.
Jakes, Wm. C., Merrickville, Ont.
James, Norman, R.R. No. 2, Dublin, Ont.
Kay, Wm. J., R.R. No. 3, Rockwood, Ont.
Knowles, Geo., Langley Prairie, B.C.
Lavis, Garnet E., Morrisburg, Ont.
Leggatt, Cyril W., St. Serfs, St. Andrews, Fife, Scotland.
Lambert, Chas. B., East Northfield, Mass, U.S.A.
Logan, John S., R.R. No. 4, Hamilton, Ont.
Long, Lorne C., Namao, Alberta.
Lowell, Vivian C., 113 4th Ave., Ottawa, Ont.
Macklin, John M., Whalley, Lancashire, Eng.
Malyon, Morley W., Uxbridge, Ont.
Mann, Arthur J., Colquitz, B.C.
Maybee, Homer J., Hilton, Ont.
Michael Geo. W., Sherkston, Ont.
Mitchener, Alvin V., R.R. No. 3, Port Rowan, Ont.
MacAdam, John A., Vankleek Hill, Ont.
Middleton, Robt. E., Essex, Ont.
McBeath, Jas. C., Woodstock, Ont.
McArthur, D. C., R.R. No. 4, Appin, Ont.
McCulloch, Oliver D., R.R. No. 1, Port Perry, Ont.
McEwan, David E., Byron, Ont.
McLeod, Norman, R.R. No. 3, Embro, Ont.
McWhinney, Harry S., 107 Roxborough St. E., Toronto, Ont.
Nelson, Chas. S., Fenwick, Ont.
Newton, R. G. V., Box 448, Woodstock, Ont.
O'Neill, Louis A., Bradford, Ont.
Parfitt, Elliott H., 1066 82nd St., Brooklyn, N.Y., U.S.A.
Patterson, Cecil F., R.R. No. 8, Watford, Ont.
Richards, T. C., Glencairn, Ont.
Riley, Chas. W., Camden East, Ont.
Robinson, Wm., 716 Ossington Ave., Toronto, Ont.
Runnalls, P. L., Barrie Island, Ont.
Shaw, John G. B., Navan, Ont.
Shaw, Clarence F., Smith's Falls, Ont.
Shaw, Harold J., Smith's Falls, Ont.
Sibbitt, Ross H., R.R. No. 1, Kingston, Ont.
Snyder, Earl S., Box 706, Kitchener, Ont.
Snyder, Arthur W., Islington, Ont.
Smith, John L., Queensville, Ont.
Sproule, Wm. H., Vankleek Hill, Ont.
Stevenson, H. E., Forbes Ave., Guelph, Ont.
Sullivan, Hampton J., 2210 Longest Ave., Louisville, Kentucky.
Walker, C. V., Malton, Ont.
Watt, A. Liddon, 367 Lansdowne Ave., Toronto, Ont.
Watt, Matthew A., Langton, Ont.
Wallace, David W., 835 Ave. C., Bayonne, N.J., U.S.A.
Weir, Wm. A., Long Branch, Ont.
Wilson, Garnet R., Merrickville, Ont.

Professional Dairy School Certificates Issued During 1916.

Bain, Garnet, Lakeside, Ont.
Bauer, Austin, New Dundee, Ont.
Coleman, W. A., Ayton, Ont.
Gallant, B., Dairy Dept., O.A.C.
Harrison, Seymour, Chesley, Ont.
Howell, Alfred, Jarvis, Ont.
Hurst, Alfred H., Nanton, Alberta.
Pollock, W. R., Kerwood, Ont.
Quirie, Ross J., 35 Wilson Ave., London, Ont.
Seehaver, H., Molesworth, Ont.
Williams, W. D., Clinton, Ont.

MEDALS, SCHOLARSHIPS AND PRIZES AWARDED APRIL, 1916.

First Year Scholarships.

Scholarships of $20 in money were awarded for groups of subjects in First Year work as follows. Highest standing with a minimum of forty per cent. of the marks of each subject, and an aggregate of seventy-five per cent. of the total number of marks allotted to the subjects in the group:—

Group 1.—English and Mathematics—J. M. Shales, Perth Rd., Ont.

Group 2.—Animal Husbandry, Dairy, Field Husbandry, Veterinary Science—D. Hart, R.R. 3, Woodstock, Ont.

Group 3.—Botany, Chemistry, Geology, Manual Training, Physics, Zoology—C. A. Campbell, R.R. 1, Marshville Ont.

Group 4.—Apiculture, Horticulture, Poultry—G. Grant, Port of Spain, Trinidad, B.W.I.

The George Chapman Scholarship.

(A prize of $20 in books awarded on the work in English of the first two years.)

The three divisions of the work under the English Department are taken into consideration in awarding the prize, namely, English Literature, English Composition and Public Speaking. Winner in 1915—A. T. Brown, R.R. 9, Peterborough, Ont.

Prizes.

Three prizes of the value of $10 each in books were awarded as follows:—

One to the second year student who composed and read before a committee the best essay on a subject assigned for the year—G. E. DeLong, Rossmore, Ont.

One to the student who stood first in general proficiency on first and second year work—Theory and Practice—J. A. Bremner, Ethel, Ont.

Canada Industrial Scholarships.

First.—$50—J. H. McCulloch, Kirkcudbrightshire, Scotland.
Second.—$30—V. C. Lowell, 113-4th Ave., Ottawa.
Third.—$20—J. M. Shales, Perth Road, Ont.

Medals.

'05 Gold Medal.—Awarded to the Fourth Year student, who, by vote of the class, is declared to be the best "all-round" man in his year. Winner—E. E. Carncross, Cloverdale, B.C.

Governor-General's Silver Medal.—First in general proficiency, first and second year work, 1914-15. Winner—J. A. Bremner, Ethel, Ont.

G. C. Creelman,
President.

FINANCIAL STATEMENT, 1916.

COLLEGE DEPARTMENT.

Expenditure.

Salaries and wages	$81,785 50
Servants' paylist	6,521 36
Meat, bread, groceries, laundry, engine room supplies and fuel	44,482 82
Advertising, printing, postage and stationery	3,998 58
Expenses, Short Courses	1,679 14
Temporary Assistance	3,999 85
Student labor	3,305 26
Travelling expenses and extra lectures	1,628 53
Library	1,973 38
Scholarships	80 00
Telephone service, rents, etc.	622 30
Furnishings and repairs	4,785 94
Sewage	540 00
Contingencies	1,332 65
Maintenance, 5 laboratories and gymnasium	7,263 06
Total expenditure	$163,998 37
Less revenue	36,986 72
Net expenditure	$127,011 65

Revenue.

Board	$26,186 60
Tuition and laboratory fees	9,158 50
Chemical analyses	168 85
Rent of rooms	177 00
Rent of cottages	247 50
Rent of post office boxes	40 00
Supplemental examinations	100 00
Fines and breakages	421 79
Sundries	486 48
Total revenue	$36,986 72

Student Labor.

(12 months.)

Total per Month.		*To Different Departments.*	
November and to December 4.	$806 63	College	$403 08
January	667 00	Chemical	59 11
February	369 89	Botanical	15 21
March	240 78	Bacteriology	51 72
April	61 89	Physics	66 06
May	248 96	Entomology	29 65
June	218 11	Gymnasium	50 56
July	90 09	Library	147 58
August	165 94	Farm	635 14
September and October	435 97	Experimental	386 74
		Dairy	20 37
		Poultry	218 08
		Horticulture	830 86
		Mechanical	242 11
		Apiculture	148 99
Total	$3,305 26	Total	$3,305 26

MACDONALD INSTITUTE AND HALL.

EXPENDITURE.

Salaries and wages	$16,907 00
Servants' paylist	2,085 05
Meat, bread, groceries, furnishings, repairs, engine room supplies, fuel and labor on grounds	17,787 24
Library and stationery	526 37
Maintenance of laboratories in Institute	2,370 14
Total expenditure	$39,675 80
Less revenue	21,074 53
Net expenditure	$18,601 27

REVENUE.

Board	$13,575 50
Tuition and laboratory fees	7,314 50
Supplemental examinations	10 00
Fines, breakages, etc.	174 53
Total revenue	$21,074 53

FARM DEPARTMENT.

EXPENDITURE.

Permanent improvements	$989 50
Wages of men, foreman and stenographer	9,513 96
Purchase and maintenance of stock	9,398 88
Farm maintenance, including repairs, blacksmithing, binder twine, seed, furnishings, fuel, light, advertising, printing, stationery, tools, implements, etc.	2,695 13
Contingencies	329 62
Total expenditure	$22,927 09
Less revenue	13,273 39
Net expenditure	$9,653 70

REVENUE.

Sale of Cattle:—		
10 Bulls at from $80.00 to $210.00	$1,275 00	
2 Bull calves for	77 00	
Lease of bull	120 00	
6 Heifers at from $90.00 to $280.00	922 00	
25 Cows at from $35.00 to $206.00	2,281 50	
5 Calves at from $20.00 to $50.00	204 00	
3 Steers, 4,500 lbs., at from $10.50 to $13.00 cwt.	538 35	
2 Heifers, 2,925 lbs., at from $8.50 to $10.00	269 25	
		$5,687 10
Sale of Pigs:—		
124 Hogs, 26,140 lbs., at from $9.00 to $11.50 cwt.	$2,515 24	
21 Boar pigs at from $10.00 to $37.00	237 00	
36 Sows at from $17.00 to $40.00	1,053 00	
		3,805 24
Sale of Sheep:—		
2 Lambs at $8.00 to $10.00	$18 00	
7 Ewes at from $14.00 to $22.00	138 00	
8 Rams at from $8.00 to $18.00	111 00	
		267 00

Sale of Milk:—		
16,461½ quarts at 4c.	$658 46	
170,225 lbs. at from $1.25 to $1.65 cwt.	2,494 80	
79.80 lbs. fat at 32c.	25 54	
		3,178 80
Service of animals		140 00
Sale of Wheat:—		
10 bus. at $1.50		15 00
Sundries		180 25
Total revenue		$13,273 39

EXPERIMENTAL DEPARTMENT.

Expenditure.

Permanent improvements	$715 70
Assistant, specialist in plant breeding, stenographer, foreman, teamsters and laborers	14,055 02
Seeds, manure and special fertilizers	933 80
Furnishings, implements, repairs, blacksmithing, etc.	899 81
Printing, postage, stationery and contingencies	425 03
Feed of horses	200 00
Total expenditure	$17,229 36

DAIRY DEPARTMENT.

Expenditure.

Permanent improvements	$498 60
Wages, including foreman, cheesemaker, buttermaker, engineer, stenographer and bookkeeper, assistant and official tester of dairy cattle	3,225 00
Purchasing, hauling and manufacturing milk into butter and cheese	3,764 11
Furniture, furnishings, repairs, etc., laboratory expenses, gas, chemicals, etc., and contingencies	906 73
Fuel and light	298 09
Total expenditure	$8,692 53
Less revenue	4,773 49
Net expenditure	$3,919 04

Revenue.

Sale of cheese, 12,828½ lbs. at from 7c. to 50c.	$2,392 62
Sale of butter, 362 lbs. at from 15c. to 31c.	109 56
Sale of cream, 1,591½ quarts at 25c.	397 88
Sale of ice cream, 20 gallons at 80c.	16 00
Sale of butter fat, 3,065.81 lbs. at from 33c. to 36c.	1,089 25
Sale of milk, 50 quarts at 4c.	2 00
Sale of skimmilk and buttermilk, 206,541 lbs. at 25c. cwt.	516 37
Sundries	9 81
Rent	240 00
Total revenue	$4,773 49

DAIRY SCHOOL.

Expenditure.

Permanent improvements	$98 00
Wages of instructors, engineer, janitor, stenographer and bookkeeper	2,256 00
Cleaning, painting, repairs and contingencies	146 36
Dairy appliances, separators, vats, expenses cheese and butter judges, inspecting factories, etc.	482 51

Advertising, printing, stationery, books, papers, etc.	124 42
Fuel and light	570 72
Purchase of milk for cheesemaking and cost of hauling milk and cream	3,997 23
Total expenditure	$7,675 24
Less revenue	2,409 35
Net expenditure	$5,265 89

REVENUE.

Sale of cheese, 4,698⅛ lbs. at from 7c. to 50c.	$834 80
Sale of cream, 695 quarts at 25c.	173 75
Sale of milk, 25 quarts at 4c.	1 00
Sale of butter fat, 2,656.03 lbs. at 38c.	1,009 29
Sale of skimmilk and buttermilk, 94,342 lbs. at 25c. cwt.	235 86
Fees	102 00
Sundries	52 65
Total revenue	$2,409 35

POULTRY DEPARTMENT.

EXPENDITURE.

Wages of assistant, stenographer and temporary assistance	$2,324 25
Permanent improvements	96 20
Purchase of stock	296 20
Furnishings and repairs	999 93
Fuel, light and contingencies	1,099 53
Experiments with incubators, fattening and feed	5,493 98
Feed of horse	50 00
Total expenditure	$10,360 09
Less revenue	6,017 78
Net expenditure	$4,342 31

REVENUE.

Sale of live poultry, 504 birds for		$825 25
Sale of Dressed Poultry:—		
5,692⅛ lbs. at from 12c. to 50c.	$1,068 95	
23½ pairs broilers at from $1.00 to $1.25	31 95	
		1,100 90
Sale of Eggs for Hatching:—		
8,291 eggs at from 4c. to 10c.	$710 82	
882 seetings at from $1.00 to $1.50	1,152 00	
		1,862 82
Sale of Eggs for Domestic Use:—		
8,090 1-6 dozen at from 15c. to 50c.		2,228 81
Total revenue		$6,017 78

HORTICULTURE DEPARTMENT.

EXPENDITURE.

Permanent improvements	$493 90
Foreman, fireman, stenographer, teamsters and laborers	7,899 93
Manure, trees, plants, bulbs, implements, tools, furnishings, repairs and contingencies	2,599 72
Fuel and light	688 66
Feed of horses	300 00
Total expenditure	$11,982 21
Less revenue	827 70
Net expenditure	$11,154 51

REVENUE.

Sale of fruit and vegetables as per statements rendered monthly	$827 70
Total revenue	$827 70

MECHANICAL DEPARTMENT.

EXPENDITURE.

Salary of foreman	$1,000 00
Tools, furnishings and repairs	246 99
Total expenditure	$1,246 99

APICULTURE DEPARTMENT.

EXPENDITURE.

Wages, equipment and maintenance	$1,744 27
Less revenue	129 20
Net expenditure	$1,615 07

REVENUE.

Sale of Honey:—		
9, 60-lb. tins at $8.00	$72 00	
445 lbs. at from 11c. to 15c.	53 00	
		$125 00
Sale of beeswax, 10½ lbs. at 40c.		4 20
Total revenue		$129 20

SOIL PHYSICS DEPARTMENT.

EXPENDITURE.

Services and expenses of temporary assistants in connection with Farm Drainage Demonstrations	$3,999 95

FORESTRY DEPARTMENT.

EXPENDITURE.

Contingencies	$873 14

SUMMARY.

	Expenditure.	Revenue.	Net Expenditure.
College	$163,998 37	$36,986 72	$127,011 65
Macdonald Institute and Hall	39,675 80	21,074 53	18,601 27
Farm	22,927 09	13,273 39	9,653 70
Experimental	17,229 36	.....	17,229 36
Dairy	8,692 53	4,773 49	3,919 04
Dairy School	7,675 24	2,409 35	5,265 89
Poultry	10,360 09	6,017 78	4,342 31
Horticulture	11,982 21	827 70	11,154 51
Mechanical	**1,246 99**	.....	1,246 99
Apiculture	1,744 27	129 20	1,615 07
Soil Physics	3,999 95	.....	3,999 95
Forestry	873 14	.....	873 14
	$290,405 04	$85,492 16	$204,912 88

S. SPRINGER,
Bursar and Superintendent.

ENROLMENT, 1916.

AGRICULTURAL COURSES.

Regular Course in Agriculture.

Senior Class.

(January to April).

Abraham, R. H., Chatham, Ont.
Amos, L., Box 125, Guelph, Ont.
Archibald, J. G., Upper Stewiacke, N.S.
Atkins, E. W., Box 684, E. Lansing, Mich.
Baird, A. B., Box 381, Fredericton, N.B.
Binkley, H. V., 30 Ontario Ave., Hamilton, Ont.
Bennett, W., 53 Crescent St., Peterboro', Ont.
Brownridge, J. W., Brandon, Man.
Bryden, R. J., 880 Hellmuth Ave., London, Ont.
Burrows, A. R., Guelph, Ont.
Carncross, E. E., Cloverdale, B.C.
Chisholm, W. M., Loch Lomond, C.B.
Clark, G. A., Poole, Ont.
Cotsworth, F. B., 231 7th St., New Westminster, B. C.
Coke, J., Erin, Ont.
Coughlan, M. H., Hope River, P.E.I.
Culp, E., Vineland Station, Ont.
Curran, H., Orillia, Ont.
Dougherty, J. L., Pembroke, Ont.
Duncan, C. C., Jordan Harbour, Ont.
Ferguson, Clarence D., Valetta, Ont.
Foulds, F. E., 58 Fuller Ave., Toronto, Ont.
French, H. S., Vernon, B.C.
Glavin, J. G., 124 Vernon St., Worcester, Mass.
Griffin, R. J., R.R. 1, Sarnia, Ont.
Hill, W. H., 9 Langham St., London W., England.
Hogan, E., Hope River, P.E.I.
Jackson, G. H., Guelph, Ont.
Johnston, J. T., Navan, Ont.
Lackner, C. E., Chesley, Ont.
Langley, Ben., 73 McTague St., Guelph, Ont.
Macdonald, W. P., New Lowell, Ont.
Martin, Norman R., Springfield, Ont.
McCulloch, J. H., New Abbey, Kirkcudbrightshire, Scot.
McDermott, A. M., Elmvale, Ont.
MacIntosh, J. M., West River, N.S.
McLarty, J. E., Rodney, Ont.
McLennan, D. M., Box 19, Lancaster, Ont.
Reilly, E. E., R.R. 4, Spencerville, Ont.
Romyn, A. E., Box 75, Pretoria, S.A.
Rowland, H. F., 62 Elm Ave., Toronto, Ont.
Schuyler, D., Box 166, Brantford, Ont.
Scott, W. H., R.R. 4, Norwood, Ont.
Shaw, W. R., Clyde River, P.E.I.
Skelton, R. J., R.R. 6, Tavistock, Ont.
Small, E. L., Wallacetown, Ont.
Stothers, S. B., Mafeking, Ont.
Strong, Wm., Guelph, Ont.
Varey, J. M., Rocklyn, Ont.
Walsh, F. W., 3 Grove Gardens, Isleworth, London, Eng.
Welton, K., 59 Benlamond Ave., E. Toronto, Ont.
Wilson, J. R., 582 Huron St., Toronto, Ont.

Junior Class.

(January to April).

Austin, W. J., R.R. 5, Simcoe, Ont.
Bird, W. J., 108 Eglinton Ave. W., N. Toronto, Ont.
Bissett, W., Goderich, Ont.
Campbell, H. M., Walkerton, Ont.
Clark, H. W., Stouffville, Ont.
Cudmore, H. J., Bronte, Ont.
Davey, A., Grimsby, Ont.
Evans, O. C., Box 477, Chilliwack, B.C.
Fleming, R. R., Orton, Ont.
Gautby, C., Simcoe, Ont.
Graham, H. W., Britannia Bay, Ont.
Guild, A. W., Jordan Harbour, Ont.
Harding, A., Lougheed, Alta.
Hearle, E., Guelph, Ont.
Hill, W. G., 18 Farnham Ave., Toronto, Ont.
Hunter, V. R., Cavan, Ont.
Knox, R. G., R.R. 2, Indian River, Ont.
Lawrence, J. W., Mandaumin, Ont.
Manton, W. D., Eglinton, Ont.
Marritt, W. G., Keswick, Ont.
Martin, I. B., Bobcaygeon, Ont.
Mason, H. C., 120 Hawthorne Ave., Ottawa, Ont.
Merkley, F. K., Williamsburg, Ont.
Murdock, F. G., "Addie," Guelph, Ont.
McConkey, O., Cayley, Alta.
McCurry, J. B., Hurdman's Bridge, Ont.
McKillican, L., St. Elmo, Ont.
McMullin, W. B., Blytheswood, Ont.
Neale, J. C., Lambeth, Ont.
Neff, H. W., R.R. 1, Hamilton, Ont.
Nixon, C. M., Box 577, Sault Ste. Marie, Ont.
Redmond, A. A., Dartmouth, N.S.
Richardson, G. A., R.R. 2, Stirling, Ont.
Roger, J. C., 169 Florence St., Ottawa, Ont.
Sanford, P. L., Coldbrook, N.S.
Schurman, D. C., North Baddeck, P.E.I.
Selwyn, H. H., 545 Gilmour St., Ottawa, Ont.

Junior Class.—Continued.

Skinner, G., St. Mary's, Ont.
Slack, P. B., Claremont, Ont.
Stokes, C., Honer St., Kitchener, Ont.
Sutton, R. G., Norwich, Ont.
Ure, Raymond D., R.R. 3, Maidstone, Ont.
Vahey, P. D., Newton Robinson, Ont.
VanEvery, W. S., R.R. 2, Welland, Ont.
Waterman, J. M., Fraserville, Ont.
Watt, R. S., Langton, Ont.
White, A. H., Sardis, B.C.
Wiggins, F. A., R.R. 4, Kemptville, Ont.

Sophomore Class.

(January to April).

Ames, G. A., 387 Kingston Rd., Toronto, Ont.
Andrew, J. F., Lucknow, Ont.
Arnold, G. J., 206 Victoria Rd., Old Charlton, Kent, Eng.
Bremner, J. A., Ethel, Ont.
Brown, A. T., R.R. 1, Peterboro', Ont.
Brown, R. W., Summerland, B.C.
Brown, W. R., 83 Silver Birch Ave., Toronto, Ont.
Clare, Fred., McAlpine, Ont.
Clarke, J. B., Keremeos, B.C.
Cooper, T., R.R. 1, Wallenstein, Ont.
Davis, H. R., 43 Glasgow St., Guelph, Ont.
DeLong, G. E., Rossmore, Ont.
Dodding, D., Lower Nicola, B.C.
Duff, C. W., 110 Myrtle Ave., Hamilton, Ont.
DuToit, A. G., DeWet Station, Worcester, S.A.
Edgar, J. D., 118 Yorkshire St., Guelph, Ont.
Edwards, G. H., Onondaga, Ont.
Fairles, W., Bloomington, Ont.
Ferguson, F. L., Parkhill, Ont.
Finch, John, Aughton, Lancashire, Eng.
Fleming, C., R.R. 3, Woodstock, Ont.
Flock, J. A., Burlington, Ont.
Geddes, Wm. F., Kinburn, Ont.
Halsey, R. F., 72 Orange St., Brooklyn, N.Y.
Hamilton, L. H., Arthur, Ont.
Hammond, W. A., Port Dover, Ont.
Hawley, W. M., 8 Colborne St., Toronto, Ont.
Heimpel, Louis C., R.R. 2, Petersburg, Ont.
Henderson, J. F., 308 Crawford St., Toronto, Ont.
Hoard, C. W., R.R. 3, Stirling, Ont.
Jakes, W. C., Merrickville, Ont.
James, N., Dublin, Ont.
Kay, W. J. B., R.R. 3, Rockwood, Ont.
Knowles, Geo., Langley Prairie, B.C.
Lambert, C. B., East Northfield, Mass, U.S.A.
Lavis, G. E., Morrisburg, Ont.
Leggatt, C. W., St. Serfs, St. Andrews, Fife, Scotland.
Logan, J. S., R.R. 4, Hamilton, Ont.
Long, L. C., Namao, Alberta.
Lowell, V. C., 113 5th Ave., Ottawa, Ont.
Macklin, J. M., Whalley, Lancashire, Eng.
Malyon, M. W., Uxbridge, Ont.
Maybee, H. J., Hilton, Ont.
Merrick, R. C., 110 Admiral Rd., Toronto, Ont.
Michael, Geo. W., Sherkston, Ont.
Middleton, R. E., Essex, Ont.
Mitchener, A. V., R.R. 3, Port Rowan, Ont.
Moore, W. B., Burlington, Ont.
Moses, E. N., Hagersville, Ont.
Munro, A. D., North Lancaster, Ont.
MacAdam, J. A., Vankleek Hill, Ont.
McArthur, D. C., R.R. 4, Appin, Ont.
McBeath, J. C., Woodstock, Ont.
McCulloch, O. D., R.R. 1, Port Perry, Ont.
McEwan, D. E., Byron, Ont.
McLeod, Norman, R.R. 3, Embro, Ont.
McWhinney, H. S., 107 Roxborough St. E., Toronto, Ont.
Nelson, C. S., Fenwick, Ont.
Newton, R. G., Box 448, Woodstock, Ont.
O'Neill, Louis A., Bradford, Ont.
Parfitt, E. H., 1066 82nd St., Brooklyn,
Patterson, C. F., R.R. 8, Watford, Ont.
Richards, T. C., Glencairn, Ont.
Riley, C. W., Camden East, Ont.
Robinson, W., 716 Ossington Ave., Toronto, Ont.
Scott, W. G., 78 McDonnel St., Peterboro', Ont.
Shaw, C. F., Smith's Falls, Ont.
Shaw, Harold J., Smith's Falls, Ont.
Shaw, J. G. B., Navan, Ont.
Shorey, W. P., R.M.D. 4, Napanee, Ont.
Sibbit, R. H., R.R. 1, Kingston, Ont.
Silverthorn, G., Islington, Ont.
Smith, J. L., Queensville, Ont.
Snyder, A. W., Islington, Ont.
Snyder, E. S., Box 706, Kitchener, Ont.
Stevenson, H. E., Forbes Ave., Guelph, Ont.
Stoddart, T., Copper Cliff, Ont.
Sullivan, H. J., 2210 Longest Ave., Louisville, Kentucky.
Walker, C. V., R.R. 4, Malton, Ont.
Walker, J. L., R.R. 1, Teeswater, Ont.
Wallace, D. W., 835 Ave. C., Bayonne, N.J., U.S.A.
Watt, A. L., 367 Lansdowne Ave., Toronto, Ont.
Watt, M. A., Langton, Ont.
Weir, Wm. A., Leng Branch, Ont.
Wilcox, C. W., Lynedoch, Ont.
Wilson, G. R., Merrickville, Ont.

Freshman Class.

(January to April).

Alguero, A. J., Panama, Rep. of Panama.
Allan, R. D., 140 Carling Ave., Ottawa, Ont.
Anderson, W. M., Islington, Ont.
Andress, A. L., Indian River, Ont.
Argue, W. F., 590 Lisgar St., Ottawa, Ont.
Atkin, E. J., Box 382, Leamington, Ont.
Atkin, Ray, North Malden, Ont.
Aylsworth, D. F., Bath, Ont.
Barber, J. S., Rossmore, Ont.
Bateson, F. R., 192 Albert St., London, Ont.
Bolton, W. E., Wiarton, Ont.
Brink, R. A., Beachville, Ont.
Buchanan, A. H., Kemptville, Ont.
Caldwell, D., 289 Wolsley St., Port Arthur, Ont.
Caldwell, W. C., Carp, Ont.
Campbell, C. A., R.R. 1, Marshville, Ont.
Carr, S. L., Burnhamthorpe, Ont.
Carson, H. A., Oakville, Ont.
Clark, A. P., Tyvan, Sask.
Cline, C. A., 161 Sanford Ave. N., Hamilton, Ont.
Coatsworth, E. E., 428 Main St., Buffalo, N.Y.
Cochrane, J. H., Broughan, Ont.
Cody, W. B., 55 Wentworth St. S., Hamilton, Ont.
Cook, M., R.R. 5, Brampton, Ont.
Costogue, C. D., 55 Hansom Place, Brooklyn, N.Y.
Coulter, W. H., Bethany, Ont.
Crews, K. W., Trenton, Ont.
Cunningham, H. S., Wakesiah Farm, Nanaimo, B.C.
Delamore, A. J., 184 Lexington Ave., New York, N.Y.
Duff, M., Myrtle, Ont.
Ferguson, G. W., Box, 233, Cobourg, Ont.
Fisher, J., Muncey, Ont.
Flatt, C. M., R.R. 2, Hamilton, Ont.
Gardhouse, W. W., Weston, Ont.
Goudie, E. B., Hespeler, Ont.
Gowland, R. C., Fergus, Ont.
Grant, G. S., 9 Queen's Park, Port of Spain, Trinidad, B.W.I.
Grunder, N. A., R.R. 1, Tiverton, Ont.
Gunn, W. R., Avonmore, Ont.
Hale, H. A., Wardsville, Ont.
Haley, N. G., Springford, Ont.
Hamilton, F. W., Box 284, Guelph, Ont.
Hammersley, A. S., 67 Forbes Ave., Guelph, Ont.
Hardy, H. W., Oakwood, Ont.
Harkness, N. J., R.R. 1, Sundridge, Ont.
Hart, D. H., R.R. 3, Woodstock, Ont.
Hetherington, T. F., 94 Roper Ave., Toronto, Ont.
Higgins, J. R., Kemptville, Ont.
Hodgins, V. W., Preston, Ont.
Howarth, C. M., 6 Hurndale Ave., Toronto, Ont.
Hunter, F. G., 628 Huron St., Toronto, Ont.
Inderwick, C. C., Perth, Ont.
Jackson, C. F., Straffordville, Ont.
Jones, T. H., Fruitland, Ont.
Karn, F. M., R.R. 1, Woodstock, Ont.
Karn, L. W., R.R. 1, Woodstock, Ont.
Kezar, J. H., Britannia Heights,Ont.
Kimball, D. A. Vineland Station, Ont.
Lamont, C., Mount Brydges, Ont.
Main, C. R., R.R. 2, Branchton, Ont.
Mason, G. R., Vineland Station, Ont.
Matheson, D. J., R.R. 3, Lucknow, Ont.
Mills, D. L., R.R. 1, Tilbury, Ont.
Minielly, E. G., Wyoming, Ont.
Moore, A. R., Box 43, Lindsay, Ont.
Munro, J. B., Slate River Valley, Ont.
Musgrave, A. H., 48 Collier St., Toronto, Ont.
McDonald, W. D., Wiarton, Ont.
McGowan, D. J., Ravenna, Ont.
McKay, W. G., R.R. 4, St. Mary's, Ont.
McLean, J., Jarvis, Ont.
Nelson, H. J., Laurel, Ont.
Odell, F. C., 19 Prince Rupert Apts, Ottawa, Ont.
Oliver, R. W., 187 Hughson St. S., Hamilton, Ont.
Patterson, D. J., R.R. 3, Newbury, Ont.
Pearsall, L. W., Oro Station, Ont.
Peters, W. R., Uno ark, Ont.
Porter, S. J., Brooklin, Ont.
Powell, M. A., R.R. 4, Kemptville, Ont.
Raymond, R. D., Boumedale, Mass.
Renwick, H. L., Hespeler, Ont.
Rutter, H. M., 11 Howard St., Belleville, Ont.
Scouten, W., Wilton, Ont.
Secord, R. R., R.R. 1, Harley, Ont.
Shales, J. M., Box 49, Perth Rd., Ont.
Shield, T. H., 153 Benson Ave., Peterboro', Ont.
Shutt, D. B., 71 St. Clements Ave., Toronto, Ont.
Sibbick, G. R., Richwood, Ont.
Smith, J. R., 320 Fairmont Ave., Ottawa, Ont.
Steckle, J. S., R.R. 2, Kitchener, Ont.
Stewart, A. M., Waba, Ont.
Stillwell, E. C., Merrickville, Ont.
Story, H. M., 45 Paisley St., Guelph, Ont.
Stover, M. H., Elginbury, Ont.
Surgenor, W. J., Cornwall, Ont.
Taylor, W. S., 647 Don Mills Rd., Todmorden, Ont.
Thomas, F. S. P., Streetsville, Ont.
Thompson, B., Box 727, Port Hope, Ont.
Tice, C., Dunboyne, Aylmer, Ont.
Toole, H., Mount Albert Ont.
Wadsworth, J., Lambeth, Ont.
Walker, R. E., R.R. 1, Milverton, Ont.
Way, J. I., 24 Gladstone Ave., St. Thomas, Ont.
Western, H. U., Windermere, Ont.
White, R. E., R.R. 1, Myrtle Station, Ont.
Whitelock, J. E., R.R. 3, Woodstock, Ont.
Wilson, W. J., Tyvan, Sask.
Wiltshire, A. E., R.R. 2, New Westminster, B.C.
Wood, W. Y., Rockton, Ont.
Wyatt, H. R., R.R. 1, Cottam, Ont.
Ziegler, W. T., 24 Paulding Ave., Tarrytown, N.Y.

Course for the Degree of B.Sc. (Agr.).

(January to April).

Third Year.

Richardson, G. A., R.R. 2 Stirling, Ont.

Irregular Students.

Cooper, W. T., Hamilton, Ont.
Murdoch, Miss, R.R. 6, Guelph, Ont.
Perine, C., Doone, Ont.
Anderson, N. S., Forest, Ont.
Davis, H. L., Guelph, Ont.
McGuigan, V., Cedar Springs, Ont.
Mann, A. J., Colquitz, Ont.
Morton, B. W., Newmarket, Ont.
Partridge, I. O., R.R. 1, Barrie, Ont.

Normal Course in Manual Training.

(January to April).

Arnold, C. H., 549 Sherbourne St., Toronto, Ont.
Chrysler, C. G., Burford, Ont.
Pomeroy, E. H., Fullerton, Ont.
Smyth, W. E., Formosa, Ont.

Short Course in Stock and Seed Judging.

Adams, F. J., Arner, Ont.
Alcock, W. H., Kenora, Ont.
Anderson, G. A., R.R. 3, Caledonia, Ont.
Anderson, H. A., R.R. 3, Caledonia, Ont.
Atchison, Rev. M., Fergus, Ont.
Baldock, W. A., Thistletown, Ont.
Balfour, F., R.R. 2, Dublin, Ont.
Banbury, H., Mount Elgin, Ont.
Barker, ——, Guelph, Ont.
Barber, P. A., Weston, Ont.
Bell, D., R.R. 2, Blenheim, Ont.
Bell, L., R.M.D. 2, Perth, Ont.
Bingham, E., R.R. 2, Hillsburg, Ont.
Blackler, W., St. Mary's, Ont.
Bond, A. R., R.R. 3, Paris, Ont.
Botting, A., R.R. 3, Harrowsmith, Ont.
Bouck, C. C., Port Rowan, Ont.
Boyd, K. M., Russell, Ont.
Bradley, P. J., North Gower, Ont.
Bragg, I. R., R.R. 4, Bowmanville, Ont.
Breault, J., R.R. 1, Enterprise, Ont.
Breckin, S. S., R.R. 2, Georgetown, Ont.
Britton, C., R.R. 2, Dublin, Ont.
Brooks, W., R.R. 3, Paris, Ont.
Brown, D., St. Mary's, Ont.
Brown, R., River View Farm, Hymers, Ont.
Bull, B. A., Brampton, Ont.
Burrows, R., R.R. 1, Hillsburg, Ont.
Burt, G., R.R. 1, Hillsburg, Ont.
Butcher, H. W., Jarvis, Ont.
Campbell, C. A., Box 273, Powassan, Ont.
Campbell, J. F., R.R. 4, Milton, Ont.
Caswell, J. W., Cache Bay, Ont.
Chambers, O. L., Fenwick, Ont.
Christie, L. J., R.R. 2, Ancaster, Ont.
Clapp, M. W., Sillsville, Ont.
Clutton, W. H., R.R. 3, Goderich, Ont.
Cole, L. B., R.R. 4, Bowmanville, Ont.
Cooper, W., Mindemoya, Ont.
Coverdale, K., R.R. 2, Canfield, Ont.
Crawford, A., Wainwright, Alta.
Currie, H. W., Cromarty, Ont.
Davis, C., R.R. 4, Ingersoll, Ont.
Davidson, J. G., R.R. 4, Kemptville, Ont.
Dean, W., R.R. 4, Shelburne, Ont.
Drennan, G. F., Alliston, Ont.
Drummond, A., Ailsa Craig, Ont.
Duke, W., R.R. 1, Sundridge, Ont.
Duncan, A., R.R., Dobbington, Ont.
Elson, W., R.R. 1, Fraserville, Ont.
Ewing, R., Elginburg, Ont.
Farr, J., R.R. 3, Weston, Ont.
Farrell, S., R.R. 1, Finch, Ont.
Ferguson, A., Warkworth, Ont.
Fitzgerald, O., R.R. 3, Harrowsmith, Ont.
Fletcher, J. L., Fletcher, Ont.
Flett, C. H., R.R. 2, Fenelon Falls, Ont.
Flynn, J. W., Alliston, Ont.
Freeman, C., Bowesville, Ont.
Gibb, H. F., R.R. 3, Stratford, Ont.
Gingersh, C., R.R. 1, Blair, Ont.
Glen, Reg., Nile, Ont.
Glover, O. M., Nottawa, Ont.
Goltz, M. H., Bardsville, Ont.
Graham, R., O.A.C., Guelph, Ont.
Grant, A. W., R.R. 5, St. Mary's, Ont.
Greenman, E., Barrie Island, Ont.
Gregg, A. R., R.R. 1, Salford, Ont.
Griffith, G., Mandaumin, Ont.
Guthrie, W., New Dundee, Ont.
Hales, A., Guelph, Ont.
Hall, G. G., R.R. 1, Bolton, Ont.
Hall, T., Plattsville, Ont.
Hay, G. A., Marvelville, Ont.
Hazen, C. B., R.R. 2, Port Rowan, Ont.
Heimpel, W., R.R. 1, Waterloo, Ont.
Hergott, S., Bamberg, Ont.
Hodgson, A., R.R. 2, Dublin, Ont.
Hoover, M. C., Dunnville, Ont.
Hassfield, J., R.R. 4, Walkerton, Ont.
Hughes, J. R., R.R. 1, Balderson, Ont.
Hume, W. R., Milton, Ont.
Hunter, A. J., R.R. 3, Hagersville, Ont.
Hunter, H. J., Sleeman, Ont.
Hutchison, L. W., Ottawa, Ont.
Hymers, G. W., Hymers, Ont.
Jackson, E. H., Straffordville, Ont.

Short Course in Stock and Seed Judging.—Continued.

Jackson, J., R.R. 1, Picton, Ont.
Jacobs, A. E., R.R. 1, Thorold, Ont.
Jamieson, N., R.R. 3, Renfrew, Ont.
Jaques, J. E., R.R. 3, Jarvis, Ont.
Johnston, E. O., R.R. 1, Mille Roches, Ont.
Johnston, W. L., R.R. 3, Orangeville, Ont.
Kellam, E., Nashville, Ont.
Kember, H. V., R.R. 1, Sarnia, Ont.
Kerr, W., Hartland, N.B.
Kinahan, G., Lucknow, Ont.
Knox, V., R.R., Fenelon Falls, Ont.
Laidlaw, T., Hagersville, Ont.
Lane, H., Barrie Island, Ont.
Langdon, A., Blezard Valley, Ont.
Leach, P., Guelph, Ont.
Lees, L. J., Clarkson, Ont.
Leeson, F. E., Aylmer, Ont.
Leitch, W., Cornwall, Ont.
Leslie, L. I., R.R. 1, Rockwood, Ont.
Lick, R. F., R.R. 3, Oshawa, Ont.
Limon, A., R.R. 2, Strathroy, Ont.
Mallory, F. R., Frankford, Ont.
Martin, L., R.R. 2, St. Williams, Ont.
Matheson, H., R.R. 2, Hillsburg, Ont.
Miller, Robt., Stouffville, Ont.
Mitchell, J., Leitch, Ont.
Mollison, R., R.R. 6, Guelph, Ont.
Moote, N. S., R.R. 1, Dunnville, Ont.
Morley, W. G., Granton, Ont.
Moyer, Gordon, Vineland, Ont.
Mundle, R. S., R.R. 3, Owen Sound, Ont.
Muslow, A., R.R. 1, Kerwood, Ont.
McClellan, G., Alton, Ont.
McCool, H., Burriss, Ont.
McCutcheon, N. A., R.R. 1, Glencoe, Ont.
McDonald, F., Warren, Ont.
McEwan, C., Byron, Ont.
McKillican, E., R.R. 2, Moose Creek, Ont.
McKinley, H. A., Pendleton, Ont.
McKinley R., Blenheim, Ont.
McLaren, Roy, R.R. 6, Perth, Ont.
McLeod, R. H., R.R. 4, Rockwood, Ont.
McMillan, F., Finch, Ont.
McNeill, A. M., R.R. 1, Strathroy, Ont.
McPherson, A., R.R. 6, Parkhill, Ont.
McRostie, W., Vernon, Ont.
McWilliams, A., R.R. 6, Guelph, Ont.
Nicholson, H. W., Mount Forest, Ont.
Nixon, H. B., Cobourg, Ont.
Nott, J., McLennan, Ont.
Parker, H. A., Uno Park, Ont.
Parsons, Chas., R.R. 2, Cayuga, Ont.
Patterson, N. B., Caledonia, Ont.
Payton, E. V., Dorion Station, Ont.
Peardon, A., 53 Ravensden Ave., Toronto, Ont.
Pennett, J., R.R. 2, Perth, Ont.
Pentland, H., Sheppardton, Ont.
Perkin, J. F., Plainville, Ont.
Petry, W. F., 26 North St., Toronto, Ont.
Phillips, F. W., Bond Head, Ont.
Piper, W. G., Salford, Ont.
Pollard, J. S., R.R. 1, Mt. Elgin, Ont.
Pollock, E. M., R.R. 1, Kincardine, Ont.
Pringle, H. L., R.R. 4, Napanee, Ont.
Proulx, A., Hanmer, Ont.
Ransom, A., Cedar Springs, Ont.
Reed, W. M., Georgetown, Ont.
Rennie, R., New Hamburg, Ont.
Rivers, W., R.R. 5, Ingersoll, Ont.
Roseburgh, O., St. George, Ont.
Roulston, W. J., Lucknow, Ont.
Ruddy, H. H., R.R. 1, Sunderland, Ont.
Rutherford, T., R.R. 2, Bolton, Ont.
Sackville, W. J., Bewdley, Ont.
Schierholtz, O. C., R.R. 2, Elmira, Ont.
Scott, W. S., Poplar, Ont.
Scott, W. W., R.R. 4, Norwood, Ont.
Sewell, L., R.R. 2, Meaford, Ont.
Shea, J. J., Warren, Ont.
Sheppard, W. W., Sutton West, Ont.
Shields, W. E., R.R. 2, Canfield, Ont.
Shuttleworth, E. H., Maidstone, Ont.
Smith, C., R.R. 3, Ridgetown, Ont.
Smith, G., Ruthven, Ont.
Smith, H., Sparta, Ont.
Smith, J. I., R.R. 4, Jarvis, Ont.
Smith, W. D., Hay, Ont.
Snow, C. W., Snowville, Ont.
Stewart, D., New Liskeard, Ont.
Suggitt, G., R.R. 1, Fenelon Falls, Ont.
Taylor, E., Moffatt, Ont.
Thomas, A. J., R.R. 2, Guelph, Ont.
Thomas, C. A., Dunblane, Ont.
Thomson, H. D., Dobbington, Ont.
Tolton, P. B., R.R. 4, Guelph, Ont.
Tulloch, C. R., R.R. 5, Wallaceburg, Ont.
Turnbull, L. W., R.R. 3, Galt, Ont.
Vanvelzer, D. L., Dunboyne, Ont.
Walker, Chas., R.R. 1, Canfield, Ont.
Walker, R. E., R.R. 1, Milverton, Ont.
Warling, E., Vandeleur, Ont.
Watson, R., R.R. 2, Woodbridge, Ont.
Watt, R. A., Guelph, Ont.
Weir, F. E., Collingwood, Ont.
White, C., R.R. 2, Pembroke, Ont.
White, H. O., Glanworth, Ont.
Willmott, J., R.R. 1, Milton, Ont.
Wilson, A. D., Ridgetown, Ont.
Wilson, J. G., R.R. 2, Georgetown, Ont.
Woolnough, C., R.R. 1, Niagara Falls, Ont.
Young, J., Ennismore, Ont.

Short Course in Fruit Growing.

Bainard, F. D., Glanworth, Ont.
Black, N. H., Rockwood, Ont.
Brill, J. P., Cedar Springs, Ont.
Currie, H. W., Cromarty, Ont.
Goudie, R., Petrolea, Ont.
Graham, R., O.A.C., Guelph, Ont.
Gray, R. C., Beamsville, Ont.
Hall, T. G., Plattsville, Ont.
Hampson, J., St. Cartharines, Ont.
Hawkins, G. B., Tillsonburg, Ont.
Haynes, G. B., 98 Gould St., Toronto, Ont.
Hopkins, S. V., Burlington, Ont.
Hunter, W., 105 Macdonell Ave., Toronto, Ont.
Hutchison, L. W., Ottawa, Ont.
Jackson, J., R.R. 1, Picton, Ont.

Short Course in Fruit Growing.—Continued.

Jones, I., R.R. 8, London, Ont.
Judge, J. P., Mono Road, Ont.
Laird, G. H., Innerkip, Ont.
Mitchell, W. A., Port Elgin, Ont.
McGuigan, V., Cedar Springs, Ont.
MacNamara, C. C., Concord, Ont.
Nixon, H., Cobourg, Ont.
Pritchard, J. J., Harriston, Ont.
Ranson, A., Cedar Springs, Ont.
Richardson, W., Simcoe, Ont.
Sharp, J., 24 Melville St., Guelph, Ont.
Skinner, Geo., Guelph, Ont.
Smith, H., Sparta, Ont.
Stock, M. G., Dovercourt Land Co., Toronto, Ont.
Thomas, N. J., R.R. 2, Guelph, Ont.
Wettlaufer, A., Tavistock, Ont.
White, H. O., Glanworth, Ont.

Short Course in Poultry.

Bowerman, C. P., 166 Bay St. S., Hamilton, Ont.
Cameron, Miss, Toronto, Ont.
Crozier, J. F., Orangeville, Ont.
Davies, E. F.,
Fitzgerald, Miss, Toronto, Ont.
Fleming, Wm., Camden, Ont.
Fletcher, C., 906 Bloor St., Toronto, Ont.
Henry, H., Cameron, Ont.
Haynes, G. B., 98 Gould St., Toronto, Ont.
Heipel, C., Baden, Ont.
Jackson R., Windsor, Ont.
Moyle, H., Richmond Hill, Ont.
Pearson, Miss V. C., Toronto, Ont.
Powell, C. W., 265 West Ave., Hamilton, Ont.
Robinson, R. H., Port Credit, Ont.
Ryan, J. H., 107 Lane St., Guelph, Ont.
Spragge, E. A., Niagara-on-the-Lake, Ont.
Trowsdale, R., R.R. 1, Puslinch, Ont.
Warren, Miss L., 23 Henry St., Toronto, Ont.
Whaley, W. P., 29 Frederica St., Toronto, Ont.
Wilkes, A., Port Colborne, Ont.
Wright, L. G., St. Mary's, Ont.
Young, Miss M. H., 524 Euclid Ave., Toronto, Ont.

Short Course in Apple Packing.

Nixon, H., R.R. 6, Cobourg, Ont.
Jones, I., R.R. 8, London, Ont.
Brill, J. P., Cedar Springs, Ont.
Culp, S. H., Vineland, Ont.
Haynes, G. P., Guelph, Ont.
Mann, A., Box 658, Welland, Ont.
McLaren, R., R.M.D. 6, Perth, Ont.
Peardon, A., 53 Ravensden Ave., Toronto, Ont.
Park, H. W., Binbrook, Ont.
Stewart, A., Poland, Ont.
White, H. D., Box 382, Glanworth, Ont.

Short Course in Dairying.

Abbott, E., R.R. 2, Belmont, Ont.
Allan, E., Elora, Ont.
Anderson, N. S., R.R. 2, Forest, Ont.
Bain, G., R.R. 1, Thamesford, Ont.
Bell, C., Kincardine, Ont.
Beninger, C., Riversdale, Ont.
Cameron, D., Tiverton, Ont.
Davis, Harold, Guelph, Ont.
Dennis, Roy, Straffordville, Ont.
Denster, H., 61 Norfolk St., Guelph, Ont.
Freeman, Carman, Bowesville, Ont.
Forman, Kenneth, E. Northfield, Mass.
Foster, W. P., Brownsville, Ont.
Gallant, Ben., St. Raphael, P.E.I.
Giffen, Gordon, Sunnidale Corners, Ont.
Green, Robert A., Waterford, Ont.
Hall, Thos., Plattsville, Ont.
Howell, Wm., Vittoria, Ont.
Hutchison, L. W., 23 Patterson St., Ottawa, Ont.
Keiller, Stanley, Wallacetown, Ont.
Leitch, Andrew, Sarnia, Ont.
Minto, Andrew, 48 Pinecrest Rd., Toronto, Ont.
Montgomery, Annie, Keswick, Ont.
Morrison, E., St. Williams, Ont.
MacKay, J. A., Baddeck, Cape Breton.
McLaren, R., R.R. 6, Perth, Ont.
Neal, R. J., Mount Forest, Ont.
Nimmo, W. R., Port Arthur, Ont.
Nossovitch, I., 64 Northcote Ave., Toronto, Ont.
Pedersen, O., Tavistock, Ont.
Peterson, P., Bright, Ont.
Pinder, F., 58 St. Arnaud St., Guelph, Ont.
Risebrough, R., Newtonbrook, Ont.
Roy, E., Russeldale, Ont.
Silcox, C. P., R.R. 3, Shedden, Ont.
Singleton, A., Kingston, Ont.
Statham, I., Dashwood, Ont.
West, C. H., Smithville, Ont.
White, J., Mooretown, Ont.
White, R., Fairmount, Ont.

Cow Testing Course.

Beninger, P. J., Ayton, Ont.
Davis, H. L., Guelph, Ont.
Davis, O. L., Greenbush, Ont.
Denster, H., Guelph, Ont.
Forman, K., Guelph, Ont.
Groff, I., New Dundee, Ont.
Hanmer, C. E., Norwich, Ont.
Hanmer, J. B., Norwich, Ont.
Haley, N. G., Springford, Ont.
Henderson J. M., Athens, Ont.

Cow Testing Course.—Continued.

Howell, W., Victoria, Ont.
Merkley, F. K., Williamsburg, Ont.
Murray, F., Scotsburn, N.S.
Mackay, J. A., Baddeck, N.S.
McLaren, R., R.R. 6, Perth, Ont.
Neal, R. G., Mount Forest, Ont.
Nimmo, W. R., Port Arthur, Ont.
Peterson, P., Bright, Ont.
Risebrough, R., Newtonbrook, Ont.
Ruby, E., Tavistock, Ont.
Singleton, A., Beachburg, Ont.
Thompson, H., Owen Sound, Ont.
Wallace, D., Bayonne, N.J.
White, A., Sardis, B.C.

Ice Cream Course.

Haak, H. E., Elmira, Ont.
Hill, Miss M., Guelph, Ont.
Leitch, A., Sarnia, Ont.
Pederson, O., Dublin, Ont.

Soft Cheese Course.

Hoffman, Miss, Preston, Ont.

Dairy Instructors' Course.

Boyes, T. F., Lambeth, Ont.
Gracey, A. E., Woodstock, Ont.
Herns, F., London, Ont.
McKenzie, G., Ingersoll, Ont.
McMillan, D., Stratford, Ont.
Rickwood, G., Essex, Ont.
Sproule, W. H., Guelph, Ont.
Smith, J. B., Alton, Ont.
Thompson, A. R., Atwood, Ont.
Travis, G., Tillsonburg, Ont.

Short Course in Apiculture.

Bashell, E., R.F.D. 2, Belleville, Ont.
Blake, C., Snow Road, Ont.
Bowers, J., Brantford, Ont.
Buchanan, Miss E., Macdonald Hall, Guelph, Ont.
Calvert, Mrs. F. C., Guelph, Ont.
Campbell, C., R.R. 2, Auburn, Ont.
Carley, A. O., Munith, Mich.
Colwill, T. J., Guelph, Ont.
Crozier, J. F., Orangeville, Ont.
Forgie, H. D., Brantford, Ont.
Fowler, R. A., Moorefield, Ont.
Frodshaw, A. W., R.R. 1, Fergus, Ont.
Garland, G., New Hamburg, Ont.
Gilboe, F., 79 Berlin St., Guelph, Ont.
Gillespie, J., Cedarville, Ont.
Hedley, Miss, The Grange, Whitby, Ont.
Hewitson, G., R.R. 5, Owen Sound, Ont.
Hutchinson, E., Mount Forest, Ont.
Judge, J. B., Mono Road, Ont.
Many, Mrs. M., Welland, Ont.
Millen, F. E., Agricultural College, Lansing, Mich.
McConkey, Miss, Guelph, Ont.
Petch, C. E., Covey Hill, Que.
Pullam, A., Hespeler, Ont.
Ratz, W. K., Restoule, Ont.
Roberts, J., 63 LaSalle Rd., Montreal, Que.
Roth, Samuel, New Hamburg, Ont.
Scott, A., Wooler, Ont.
Sharp, J., 24 Melville St., Guelph, Ont.
Smith, Russel, R.R. 1, Enniskillen, Ont.
Statton, F., R.R. 3, Mitchell, Ont.
Stewart, M. C., 215 Woolwich St., Guelph, Ont.
Switzer, C. B., R.R. 1, St. Mary's, Ont.
Trowsdale, S., R.R. 1, Puslinch, Ont.
Tyler, F., Lambeth, Ont.
Weir, W. A., Long Branch, Ont.
Wood, W. C., 16 Stinson St., Hamilton, Ont.

SUMMER COURSES.

Science Teachers.

First Year.

Anderson, J. A., 85 Barrack St., Kingston, Ont.
Ballard, M. R. Nobleton, Ont.
Davies, N., Essex, Ont.
Erwin, W. M., R.R. 4, Simcoe, Ont.
Foster, Miss Helen E., R.R. 4, Cayuga, Ont.
Foster, Miss I. A., Shakespeare, Ont.
Graham, Mrs. E. D., Winchester, Ont.
Hay, Wm. D., Winchester, Ont.
Jackson, A. B., Glenallan, Ont.
Johnson, G. S., Whitby, Ont.
Madill, A. J., Fort William, Ont.
Manning, R. L., Rainy River, Ont.
Ricker, H. E. A., Normal School, North Bay, Ont.
Shorey, P., Brantford, Ont.
Smith, F. P., 222 Church St., Brockville, Ont.
Smith, T. C., Campbellford, Ont.
Welsh, D. A., Arnprior, Ont.

Science Teachers.

Second Year.

Adams, J. G., R.R. 1, Cardinal, Ont.
Bell, E. T., 53 Spruce St., Toronto, Ont.
Bunton, G., Smith's Falls, Ont.
Copeland G. E., Port Hope, Ont.
Dobbie, I., New Liskeard, Ont.
Donaldson, W., 167 Sunnyside Ave., Ottawa, Ont.
Elliott, C., R.R. 4, Ilderton, Ont.
Elliot, F. V., Moosomin, Sask.
Graham, H. H., Winchester, Ont.
Haviland, H. J., 723 Carlaw Ave., Toronto, Ont.
Miller, G. A., Normal School, Ottawa, Ont.
Porter, Wm. A., Forest, Ont.
Shales, W. E., Kincardine, Ont.
Short, J. A., Swansea, Ont.
Smith, D. E., Burlington, Ont.
Summers, C., Cannington, Ont.

Public School Teachers.

First Year.

Abra, Mabel M., Delhi, Ont.
Adams, Ethel M., Foxboro, Ont.
Alkenbrack, Alma J., Tamworth, Ont.
Anguish, Hazel, Caledonia, Ont.
Beard, Myrtle A., Hokart, Ont.
Beckton, Mae, 116 Askin St., London, Ont.
Bentham, Rena F., R.F.D. 2, Burketon Jct., Ont.
Bishop, Lillian M., R.R. 2, Prescott, Ont.
Booth, Winnie K., Niagara Falls, Ont.
Bovaird, Fannie, Hagerman, Ont.
Boyd, P. S., Mountain, Ont.
Bradshaw, Evelyn, R.R. 1, St. Paul's, Ont.
Bram, Mildred, 106 Beverley St., Toronto, Ont.
Breedon, Ethyle M., R.R. 2, Tottenham, Ont.
Brueckner, Magdalena, Tavistock, Ont.
Cameron, Ilah, Thamesford, Ont.
Casselman, Zella, R.R. 1, Morrisburg, Ont.
Comfort, Clementina, Wellandport, Ont.
Coon, Amy, Morton, Ont.
Copeland, Margaret, R.R. 5, Thamesville, Ont.
Crosbie, Mary, 595 Oxford St., London, Ont.
Currie, Mina, R.R. 3, Wingham, Ont.
Davis, Blanche, Barton, Ont.
Davidson, Bessie, Kingwood, Ont.
Douglas, Jessie, R.R. 1, Milton, Ont.
Desmond, Myrtle, Ridgetown, Ont.
Dunbar, Jennie, R.R. 3, Rockwood, Ont.
Dusten, Eva B., 207 S. Milton St., Sarnia, Ont.
Elliott, Annetta J., R.R. 1, Wilton Grove, Ont.
Elliott, George, Munster, Ont.
Elliott, Margaret, Port Arthur, Ont.
Ferguson, Pearl, Fingal, Ont.
Ferrier, Florence, R.R. 1, Elora, Ont.
Foley, Martha, Hanbury, Ont.
Fortner, Florence, Ilderton, Ont.
Gemeroy, Geo., Winchester, Ont.
Gilchrist, John, Markham, Ont.
Gilholm, Eva, Bright, Ont.
Graham, Jessie, Peterboro', Ont.
Grant, Mabel, Bryanston, Ont.
Groat, Jessie, Snelgrove, Ont.
Groh, Miss A. L., R.R. 1, Hespeler, Ont.
Groh, Mary, R.R. 1, Hespeler, Ont.
Guinan, Marjorie, Dashwood, Ont.
Gulston, H. F., Lefroy, Ont.
Hanlon, Grace, Guelph, Ont.
Hanlon, Helen, Box 334, Guelph, Ont.
Hilbert, Edith, Walkerton, Ont.
Holmes, Lily, R.R. 3, New Hamburg, Ont.
Honston, Edna, Moorfield, Ont.
Howey, Kathleen, Eden, Ont.
Huffman, Ethel, Peterboro', Ont.
Kerr, Bertie, 309 6th St. E., Owen Sound, Ont.
Knowles, Edith, 465 Huron St., Stratford, Ont.
Lapp, Miss A. J., 207 O'Connor St., Ottawa, Ont.
Luckens, Ethel, Dorion, Ont.
Maley, Eva, Kemptville, Ont.
Melady, T. S., Seaforth, Ont.
Merrick, Mary P., 101 Montrose Ave., Toronto, Ont.
Metcalfe, F., North Augusta, Ont.
Morrison, Miss E., 1218 1st Ave. W., Owen Sound, Ont.
Mounce, Lizzie M., Alexander St., Guelph, Ont.
McBratney, Ruby, 39 Amy St., Brockville, Ont.
McCallum, Kathleen, R.R. 2, Belmont, Ont.
McCallum, Margaret, Brampton, Ont.
McCord, Ethel, Carp, Ont.
McCully, Margaret, R.R. 2, St. Mary's, Ont.
MacDonald, Christina, Staffa, Ont.
McIntyre, Annie, Highgate, Ont.
McKee, Miss M., 92 Lyall Ave. E., Toronto, Ont.
MacKenzie, Beatrice, St. Catharines, Ont.
McLean, Florence, Lansing, Ont.
McLelland, Margaret, Ethel, Ont.
McLeod, Janet, R.R. 1, Hawkestone, Ont.
McNaughton, Agnes, Walkerton, Ont.
Oakes, Elwood, 14 Kathleen St., ——, Ont.
O'Neill, Kathleen, Box 61, Omemee, Ont.
Payne, Annie C., Port Lambton, Ont.

Public School Teachers—First Year.—Continued.

Parkinson, J. T., 299 Ridout St. S., London, Ont.
Peck, Evelyn, Eden, Ont.
Pfohl, Edith, Carlsruhe, Ont.
Quigley, Miss I., Wardsville, Ont.
Quigley, Miss W. L., Wardsville, Ont.
Reinke, Clara, Ancaster, Ont.
Revell, Lillian, 23 Powell St., Guelph, Ont.
Richardson, Miriam, Janetville, Ont.
Roach, Mrs. L. W., Whitevale, Ont.
Ronald, Annie, Parkhill, Ont.
Ross, Miss E. M., Argyle, Ont.
Ross, Wilhelmina, Box 123 Allandale, Ont.
Rossiter, Vera, Crampton, Ont.
Rydall, W. B., Fullarton, Ont.
Schummacher, Miss Alfra, R.R. 1, Mildmay, Ont.
Scott, Anna, R.R. 2, Marmora, Ont.
Shaw, R. J., Owen Sound, Ont.
Smith, Cora E., R.R. 4, Spencerville, Ont.
Smith, Laura, Creemore, Ont.
Smith, Mabel, Palermo, Ont.
Stewart, Ida, Kincardine, Ont.
Stewart, Mary, 54 Elizabeth St., Stratford, Ont.
Stickwood, Alice, Newmarket, Ont.
Switzer, Willa, Thorndale, Ont.
Thompson, Pearl, Stirling, Ont.
Tough, Grace, Shakespeare, Ont.
Tudhope, Margaret, Orillia, Ont.
Tugman, Agnes, Owen Sound, Ont.
Valley, Rubena, R.R. 1, Point Fortune, Que.
Wilson, Ethel, Moorfield, Ont.
Woodger, Ruth, Trenton, Ont.
Woolatt, J. D., London, Ont.
Wragg, Vera, Stouffville, Ont.
Young, Ida, Dorchester, Ont.

Public School Teachers.

Second Year.

Beamer, Josephine, R.R. 2, Wellandport, Ont.
Clarke, Mamie, R.R. 5, Embro, Ont.
Cole, Ethel, Princeton, Ont.
Coutts, H. H., Niagara Falls, Ont.
Crosbie, Katharine, 595 Oxford St., London, Ont.
Dickson, Christina, R.R. 4, Walton, Ont.
Douglas, Annie, Uxbridge, Ont.
Dundas, Sadie E., R.R. 4, Port Hope, Ont.
Finch, Bert A., Belmont, Ont.
Finlayson, Janet, 20 Gerrard St. E., Toronto, Ont.
Galloway, W. H., R.R. 1, Arkona, Ont.
Graham, Miss L., North Gower, Ont.
Griffiths, Lillian, 133 Elizabeth St., Stratford, Ont.
Hobbs, Bessie, Thorndale, Ont.
Holmes, Laura, Newton, Ont.
Howard, E. B., Ohsweken, Ont.
Johns, A. F., 1485 Danforth Ave., Toronto, Ont.
Lamont, Agnes, Jeannette's Creek, Ont.
Lamont, Janet, Wardsville, Ont.
McColl, Margaret, Petrolea, Ont.
McDonald, Miss M. J., Dalhousie Station, Que.
McCorquodale, Elizabeth, Woodstock, Ont.
McCort, Nellie, Bolton, Ont.
McGregor, Milton, Stratford, Ont.
MacTavish, Jean, R.R. 4, Kincardine, Ont.
Nesbitt, Ada, Aylmer, Ont.
Owens, Margaret, Hawkesbury, Ont.
Pomeroy, J. B., Bridgeport, Ont.
Robinson, Ralph W., Komoka, Ont.
Sadler, Annie, R.R. 3, Eganville, Ont.
Scott, Annie, Dundalk, Ont.
Scott, Bernice, Dundalk, Ont.
Sheppard, Eva, Orono, Ont.
Snetsinger, Miss Murray, 183 Rectory St., London, Ont.
Speers, Mina, New Lowell, Ont.
Waters, Bessie, Fingal, Ont.
Weir, Flossie, 12 Teresa St., London, Ont.
Wendt, W. F., Mildmay, Ont.
White, Olive, R.R. 1, Sault Ste. Marie, Ont.
Yeo, Mabel, Seagrave, Ont.
Zeron, Francis, Morrisburg, Ont.

School for Rural Leadership.

Ayers, Mildred, R.R. 2, Komoka, Ont.
Bailey, Mabel, Auburn, Ont.
Bemister, Geo., Haliburton, Ont.
Brown, Florence, R.R. 2 Ilderton, Ont.
Bycraft, Miss Esther, R.R. 2, Ilderton, Ont.
Campbell, N. A., Inwood, Ont.
Conway, Rev. Wm., Auburn, Ont.
Dutton, Miss H., 20 London Rd. W., Guelph, Ont.
Earp, Prof. E. L., ———.
France, T. C., Milberta, Temiskaming, Ont.
Fraser, Rev. J. R., Uxbridge, Ont.
Hale, Rev. Arthur, Rockland, Ont.
Loveday, A. J., Oil City, Ont.
Marsh, Miss Ada, R.R. 2, Ilderton, Ont.
Merner, H. L., Copetown, Ont.
Murchie, R. W., Agri. College, Winnipeg, Man.
McClure, Miss A., Klemburg, Ont.
McClure, Miss S., R.R. 2, Weston, Ont.
Scobie, James, McIntyre, Ont.
Shearer, Mrs. W. K., Drumbo, Ont.
Shearer, W. K., Drumbo, Ont.
Simmons, Geo. N., Springford, Ont.
Wyse, Mrs. B., Puslinch, Ont.
Yates, Miss, Port Credit, Ont.

New Students in Agricultural Classes, September 17th.

First Year.

Arnold, J. I., 549 Sherbourne St., Toronto, Ont.
Beatty, R. G., Box 76, Port Hope, Ont.
Bouis, E. G., North Ave., Mount Washington, Maryland.
Brickley, J. J., Marysville, Ont.
Broughton, C. E., Whitby, Ont.
Brown, P. C., R.R. 2, Ilderton, Ont.
Butters, H., Lumby, B.C.
Bowman, J. W., 555 Dovercourt Rd., Toronto, Ont.
Carnochan, P., Dairy Dept., O. A. C., Guelph, Ont.
Clarke, G. H., Ravenscliffe, Ont.
Currier, W. L., 36 Cooper St., Ottawa, Ont.
Dann, C. J., 12 Eastbourne Ave., Hamilton, Ont.
Dunn, C. I., 30 E. Preston St., Baltimore, Md., U.S.A.
Evans, C. C., Box 397 Chilliwack, B.C.
Fraser, G. S., Newfield, Ont.
Frey, C., R.R. 2, Waterloo, Ont.
Gregory, R., 1006 Traders Bank Bldg., Toronto, Ont.
Hall, J. A., Etwell, Ont.
Hamilton, C. J., Godfrey, Ont.
Harris, H. C., Alliston, Ont.
Herold, B., Beamsville, Ont.
Hickling, E. F., R.R. 2, Shanty Bay, Ont.
Hopper, W. C., Westboro, Ont.
Jamieson, H. A., Camborne, Ont.
Johnson, H. J., R.M.D., Iroquois, Ont.
Kernohan, R. W., 352 Williams St., London, Ont.
King, S. W., Hickson, Ont.
Leavens, C. R., 123 Moira St. W., Belleville, Ont.
Leitch, A. D., R.R. 1, Strathroy, Ont.
Lindsay, R. J., R.R. 3, Thorndale, Ont.
Marritt, F. F., R.R. 3, Keswick, Ont.
Maynard, D. S., R.R. 3, Chatham, Ont.
Mead, A. W., Riverside Farm, Smithville, Ont.
Misener, C. W., R.R. 2, Dunnville, Ont.
Murdoch, W., Box 476, Collingwood, Ont.
McGuigan, V. G., Cedar Springs, Ont.
Macdonald, J. A., Forbes Ave., Guelph, Ont.
McKay, H. T., Science Hill, Ont.
MacKay, J. W., Fitzroy Harbour, Ont.
MacLean, J. F., R.R. 2, Durham, Ont.
McLennan, S. C., 346 Bronson Ave., Ottawa, Ont.
Nixon, J. H., Picton, Ont.
Patchett, G., Armstrong, B.C.
Patterson, J. F., 54 Brighton Row, Brantford, Ont.
Pawley, J. L., R.R. 1, Brampton, Ont.
Pegg, J. L., R.R. 2, Claremont, Ont.
Penhale, R. K., St. Thomas, Ont.
Peters, H. T., Hampton, Ont.
Porter, A. M., 158 Close Ave., Toronto.
Porter, H. F., 158 Close Ave., Toronto, Ont.
Quirie, R. J., Delaware, Ont.
Salter, E. J., Industrial School, Mimico, Ont.
Scott, G. H., 201 Patterson Ave., Ottawa, Ont.
Sheppard, W., Sutton West, Ont.
Silcox, W. B., R.R. 3, Shedden, Ont.
Smallfield, H. A., Renfrew, Ont.
Spofford, H. J., R.R. 1, Eugenia, Ont.
Taylor, L. L., 200 Don Mills Rd., Toronto, Ont.
Thompson, J. W., Stirling, Ont.
Wai, Sak Poy, 71 Quebec St., Guelph, Ont.
Watson, H. J., R.R. 5, Brampton, Ont.
Whillans, H. G., Hurdman's Bridge, Ont.
West, S. R., R.R. 5, Woodstock, Ont.
White, S., 2078 Davenport Rd., Toronto, Ont.
Whiteside, G. A., O.A.C., Guelph, Ont.
Williamson, A. J., 248 Frank St., Ottawa, Ont.
Zavitz, C. H., R.R. 2, Ilderton, Ont.
Zavitz, E. R., R.R. 1, Port Colborne, Ont.

Second Year.

Almey, J. R., R.R. 3, Petrolia, Ont.
MacKenzie, F. C., 210 Liverpool St., Guelph, Ont.
Quail, E. J., Edwards, Ont.

Third Year.

Davis, H. L., 814 Fifth Ave., New Westminster, B.C.
Elder, R. C., Canfield, Ont.
Gandier, B. P., Pelee Island, Ont.
Hempson, J. A., Great Glacton Hall, Essex, Eng.
Luckham, C. F., Birnam, Ont.
Maxwell, R. W., R.R. 5, Watford, Ont.
MacDonald, A. B., Glassburn, N.S.
Scales, A. A., St. Eleanors, P.E.I.
Sproule, W. H., Vankleek Hill, Ont.
Stewart, S. A., Tintern, Ont.
Timms, J. N., Windsor, Ont.

New Students in Agricultural Classes, September 17th.—Continued.

Fourth Year.

Aiton, R. M., R.R. 1, Agincourt, Ont.
Creed, R., Albion, P.E.I.
Elliott, D., Agincourt, Ont.
Fancher, P. L., Florence, Ont.
Gardiner, W. F., Sarnia, Ont.
Lawson, E. V., Lorneside Farm, R.R. 3, Goderich, Ont.
McCready, S. B., O.A.C., Guelph, Ont.
MacKenzie, A. W., Bedford, N.S.

Course for B.Sc. (Agr.).

(September to December).

Dennis, O. C., Burgessville, Ont.

Special Students.

(September to December).

Shaw, H. J., Smith's Falls, Ont.

Manual Training.

(September to December).

Capel, John, Shanty Bay, Ont.
Casselman, G. K., Williamsburg, Ont.
Geiger, E., Harrow, Ont.
Paton, W. D., R.R. 4, Fergus, Ont.
Swindle, W. W., Guelph, Ont.
Weir, R., Killam, Alta.

MACDONALD INSTITUTE.

Domestic Science Courses.

Junior Normal Domestic Science Course.

(January to June).

Birkett, Mary, Box 231, Niagara Falls, Ont.
Duff, Mary E., Cookstown, Ont.
Geddes, A. Mabel, 16 Pearl St., St. Thomas, Ont.
Grant, B. Jennie, Duthill, Ont.
Lammiman, Aleda, Currie's Crossing, Ont.
McCully, Dorrit L., 30 Botsford St., Moncton, N.B.
MacIntyre, F. Christine, Kempville, Ont.
Murray, Olive H., Ingersoll, Ont.
Nixon, Laura, St. George, Ont.
Wallace, Elizabeth, Seagrave, Ont.
Willson, Millie, Marshville, Ont.

Senior Normal Domestic Science Course.

(January to June).

Black, Chryssa L., 64 Glasgow St., Guelph, Ont.
Easton, Helen L., Leamington, Ont.
Hopper, Margaret, Cookstown, Ont.
Macdonald, M. Lillian, Sherbrooke, N.S.
Moxon, Mary C., Box 392, Truro, N.S.
Moyer, Grace I., Paisley Memorial Parsonage, Guelph, Ont.
Percy, Kate M., Bowmanville, Ont.
Ramage, Minnie, Clarence, Ont.
Rumball, Mabel E., 166 Main St., Niagara Falls, Ont.
Scott, Annie P., Nottawa, Ont.
Scott, Mary H., Bervie, Ont.
Smith, Eleanor M., Box 95, Truro, N.S.
Watson, M. Beatrice, 50 Ominica St., Moose Jaw, Sask.
Williams, Marjorie H., Jarvis, Ont.

Junior Associate Course.

(January to June).

Balkwill, Mabel, 146 Wellington St., St. Thomas, Ont.
Bright, Doreen, 447 Somerset St., Ottawa, Ont.
Chown, Dorothy, Sunnyside, Union St., Kingston, Ont.
Cooke, Florence E., 72 Grenville, St., Toronto, Ont.

Junior Associate Course.—Continued.

Creelman, Margaret, O.A.C., Guelph, Ont.
Hoey, Mary, R.R. 5, Campbellford, Ont.
Houghton, Dora A., Heaslip, Ont.
Langford, Elizabeth, Cobourg, Ont.
Miles, Pauline, 396 College St., Toronto, Ont.
Montgomery, Edna W., Suite 7, Hugo Apts., Winnipeg, Man.
Sheridan, Marie L., 15 Forest Hill Rd., Toronto, Ont.
Smith, Verna L., 339 Davis St., Sarnia, Ont.

Senior Associate Course.

(January to June).

Beven, Frances, Ancaster, Ont.
Grenside, Edith F., 115 Norfolk St., Guelph, Ont.
Saxton, Margaret, Lakeview, Ont.
Shannon, Florence, c-o Major Shannon, London, Ont.
Stewart, Marguerite, Abernethy Apts., 6 Howard St., Toronto, Ont.
Story, Janet O., Crossdoney, Guelph, Ont.
Wells, Nellie, 368 Victoria St., Toronto, Ont.

Junior Housekeeper Course.

(January to June).

Birdsall, Etta, R.R. 1, Courtland, Ont.
Elliot, Edith, Morrisburg, Ont.
Fraser, Rona W., 135 Rutledge Ave., East Orange, N.J., U.S.A.
Grant, E. Helen, Forbes Ave., Guelph, Ont.
Healey, Mary H., 85 King St., St. Catharines, Ont.
Loynachan, Eva, R.R. 1, Williamstown, Ont.
O'Flynn, Edith M., Shelburne, Ont.
Winlow, Helen, 24 Arthur St., Guelph, Ont.
Witmer, Mabel, Sub P.O. No. 2, Victoria, B.C.

Senior Housekeeper Course.

(January to June).

Allan, Frances, 253 Waterloo Ave., Guelph, Ont.
Hall, Jessie R., R.R. 4, Bright, Ont.
Henderson, Henrietta P., Blenheim, Ont.
Hopkins, Edith, R.R. 1, Lindsay, Ont.
McIlquham, Jean M., Lanark, Ont.
Murray, Alicia W., 58 Ontario St., Stratford, Ont.
Reek, Florence, Blenheim, Ont.
Stevenson, Kathleen, Orangeville, Ont.

Homemaker Course.

(January to June).

Bell, Jean D., Chesley, Ont.
Buck, Phyllis, 70 Dufferin Ave., Brantford, Ont.
Carscadden Helen Burketon Jct., Ont.
Clemens, May, Hespeler, Ont.
Davis, Marjorie, Neepawa, Man.
Hanson, Selma, Wheatley, Ont.
Harvey, H., 297 Prince Arthur St. W., Montreal, Que.
Hertsis, Georgina, 221 Victoria St., Kitchener, Ont.
Hewson, Edna P., Penetanguishene, Ont.
Houghton, Mary, Heaslip, Ont.
Keith, Mabel, Granton, Ont.
Kingsboro, Maragaret, R.R. 1, York, Ont.
Lineham, Elizabeth, 1531 Barclay St., Vancouver, B.C.
Lineham, Elma, 1531 Barclay St., Vancouver, B.C.
Marsh, Victoria M., Lindsay, Ont.
Monteith, Maude, R.R. 2, Stratford, Ont.
Nixon, Mabel, 112 Albert St., Sault Ste. Marie, Ont.
Pearson, Jewell, 65 Langley Ave., Toronto, Ont.
Shannon, Marian, 661 Queen St., Sault Ste. Marie, Ont.
Stewart, Jennie C., Chesley, Ont.
Trotter, Kathleen, North Forest Hill Rd., York, Ont.
Tyrrell, Mary, 14 Walmer Rd., Toronto, Ont.
Wells, Adah, 268 Victoria St., Toronto, Ont.
Woodyatt, Doreen, 140 Alfred St., Brantford, Ont.

Homemaker Course.

(January to December).

Gilbert, Kathleen, R.R. 8, St. Thomas, Ont.
Gowan, Laura, R.R. 3, Dutton, Ont.
Hodgetts, Gwyneth, 218 McLaren St., Ottawa, Ont.
Houston, Madeline J., Hawkestone, Ont.
Lyles, Dorothy, 132 North Gross St., East Orange, N.Y.
Pratt, Orris, Sault Ste. Marie, Ont.
Tisdall, Nita, 340 Russell Hill Rd., Toronto, Ont.
Towell, Dorothy, Long Branch, Ont.
Wilson, Hattie, Wyoming, Ont.

Homemaker Course.

(January to March).

Baillie, Mary, Simcoe, Ont.
Blake, Margaret, 24 Prince Arthur Ave., Hamilton, Ont.
Campbell, Reba, 124 Robinson St., Hamilton, Ont.
Greene, G., 124 Bloor St. W., Toronto, Ont.
McAllister, E., 485 Waterloo Ave., Guelph, Ont.
Mulveney, Vera, 518 West 111th St., New York, N.Y., U.S.A.
Penhorwood, Reita, Sault Ste. Marie, Ont.
Turner, Helen, Little Current, Ont.
Wilson, I., 1048 Queen St., Sault Ste. Marie, Ont.

Short Course in Domestic Science.

(January to March).

Anderson, Agnes, Centralia, Ont.
Ball, Jennie, R.R. 1, Uxbridge, Ont.
Bott, Alpha, R.R. 4, Embro, Ont.
Bradley, Ina, Stittsville, Ont.
Bradley, Sadie, Stittsville, Ont.
Burnett, Edith, Box 801, North Bay, Ont.
Burns, Ada M., Rockwood, Ont.
Bye, Bessie, R.R. 2, Ariss, Ont.
Cressman, Laura, 18 Pandora Ave., Kitchener, Ont.
Fellowes, Lois, 47 Cressciffe Apts., Wellesley St., Toronto, Ont.
Fleming, Lally, 566 Ninth St. E., Owen Sound, Ont.
George, Jennie, Dobbinton, Ont.
Henderson, Carrie, 452 Don Mills Rd., Toronto, Ont.
McDonald, Jessie, R.R. 3, Woodstock, Ont.
McIntosh, Alice, R.R. 7, Guelph, Ont.
McLevin, Gussie, R.R. 2, Tavistock, Ont.
Otterson, Theresa, R.R. 2, Billing's Bridge, Ont.
Pallister, Janet, R.R. 6, Woodstock, Ont.
Peppler, Annie, 29 Glasgow St., Kitchener, Ont.
Poole, Dell, Dobbinton, Ont.
Richmond, Hilda M., R.R. 4, Bright, Ont.
Slater, Phyllis, "Rosmead," Lampton St., Victoria, B.C.
Stewart, Ethel M., Glamis, B.C.
Thompson, Frances, Box 266, Tillsonburg, Ont.
Tisdall, Donnie, 340 Russell Hill Rd., Toronto, Ont.
Weber, Nellie, R.R. 1, Waterloo, Ont.

Homemaker Course.

(April to December).

Anderson, Gladys E., 167 Lowther Ave., Toronto, Ont.
Gies, Vera, 338 King St. W., Kitchener, Ont.
Hernal, Margaret, Muirkirk, Ont.
MacCallum, Rita, 350 King St. W., Kitchener, Ont.

Short Course in Domestic Science.

(April to June).

Brebner, Mary, 67 Howland Ave., Toronto, Ont.
Brown, Mary, Springfield, Ont.
Cox, Marian, Woodburn, Ont.
Douglass, Ota, Welland, Ont.
Douglass, Thelma, 3 Grove St., Welland, Ont.
Downs, Irene, R.R. 1, Hornby, Ont.
Foley, Rosalie, R.R. 1, Arthur, Ont.
Jenvey, Winnifred, Ingersoll Ont.

Short Course in Domestic Science.—Continued.

Kratz, Faith A., Kingsville, Ont.
Kratz, Hattie, Kingsville, Ont.
Kuhl, Martha, Port Elgin, Ont.
Montgomery, Mary, 7 Hugo Apts., Winnipeg, Man.
Redman, Lottie, Echo Bay, Ont.
Smithson, Laura, R.R. 8, Peterboro', Ont.
Stewart, Pearl, R.R. 2, St. Catharines, Ont.
Tait, Frankie, 29 Queen St., Belleville, Ont.
Thompson, Sarah, R.R. 2, St. Catharines, Ont.
Wilson, Ella, R.R. 1, Ottawa, Ont.

Optional Students.

(April to June).

Dunbar, Miriam, 99 Quebec St. W., Guelph, Ont.
Hayes, Nanno, Suffolk St., Guelph, Ont.

Student Worker.

(April to June).

Buchanan, Eliza., Campbellford, Ont.

Junior Normal Domestic Science Course.

(September to December).

Beatty, Marie, 552 18th Ave. W., Calgary, Alta.
Garrow, Jean, 633 Furby St., Winnipeg, Man.
Jackson, Alice, North Lynd Farm, Downsview, Ont.
Kerr, Marion, 232 College Ave., Sarnia, Ont.
Lawson, Olive, 735 13th St., Brandon, Man.
Lees, Verna, R.R. 1, Red Deer, Alta.
McBride, Marion, Kentville, N.S.
Moffatt, Olive, Renfrew, Ont.
Rowat, Mabel, Simcoe, Ont.
Ruttan, Mildred, Enderby, B.C.
Soule, Helen, Chesterville, Ont.
Staples, Adalene, 456 Greenwood Place, Winnipeg, Man.
Tinney, Olla, 831 2nd St., Medicine Hat, Alta.
Wade, Eva, 134 13th St., Brandon, Man.
Wark, Edith, 280 Pacific Ave., West Toronto, Ont.

Senior Normal Domestic Science Course.

(September to December).

Birkett, Mary, Box 231, Niagara Falls, Ont.
Cooke, Florence, 72 Grenville St., Toronto, Ont.
Duff, Mary E., Cookstown, Ont.
Geddes, A. Mabel, 16 Pearl St., St. Thomas, Ont.
Grant, B. Jennie, Duthill, Ont.
Lammiman, Aleda, Currie's Crossing, Ont.
McCully, Dorrit L., 30 Botsford St., Moncton, N.B.
MacIntyre, F. Christine, Kempville, Ont.
Nixon, Laura, St. George, Ont.
Wallace, Elizabeth, Seagrave, Ont.

Junior Associate Course.

(September to December).

Casselman, Elsie, Morrisburg, Ont.
Day, Dorothy, O.A.C., Guelph, Ont.
Gow, Annie, 105 Lower Union St., Kingston, Ont.
Graham, Irene, O.A.C., Guelph, Ont.
Innes, Margaret Coldbrook, N.S.
McIntosh, Mary, 14 Delhi St., Guelph, Ont.
McWilliam, Mary, Dutton, Ont.
Nelson, Edna, 69 Wellington St., St. Thomas, Ont.
Parks, Edna, Oil Springs, Ont.
Steele, Mary, 4673 12th Ave. W., Vancouver, B.C.
Young, Ella M., Kentville, N.S.

Senior Associate Course.

(September to December).

Balkwill, Mabel, 146 Wellington St., St. Thomas, Ont.
Bright, Doreen, 447 Somerset St., Ottawa, Ont.
Chown, Dorothy, Sunnyside, Union St., Kingston, Ont.
Creelman, Margaret, O.A.C., Guelph, Ont.
Langford, Elizabeth, Cobourg, Ont.
Montgomery, Edna, Suite 7, Hugo Apts., Winnipeg, Man.
Sheridan, Marie L., 15 Forest Hill Rd., Toronto, Ont.
Smith, Verna L., 339 Davis St., Sarnia, Ont.

Junior Housekeeper Course.

(September to December).

Aitken, Ella, Beeton, Ont.
Beattie, Jean, Blair, Ont.
Bott, Alpha, R.R. 4, Embro, Ont.
Cornell, Ada, Port Stanley, Ont.
Davis, Mabel, 706 124th St., Edmonton, Alta.
Fleming, Verna, R.R. 3, Woodstock, Ont.
Hodgins, Eileen, 1 Centre St., St. Catharines, Ont.
Lammiman, Gladys, Currie's Crossing, Ont.
McLaren, Janet, R.M.D. 6, Perth, Ont.
Robertson, Helen, Barrington Passage, N.S.
Stone, Mrs. Jean, Red Wing, Ont.
Zavitz, Edith, R.R. 2, Ilderton, Ont.

Senior Housekeeper Course.

(September to December).

Birdsall, Etta, R.R. 1, Courtland, Ont.
Elliot, Edith, Morrisburg, Ont.
Fraser, Rona, 135 Rutledge Ave., East Orange, N.J.
Grant, E. Helen, 43 Forbes Ave., Guelph, Ont.
Healey, Mary, 85 King St., St. Catharines, Ont.
O'Flynn, Edith M., Shelburne, Ont.
Winlow, Helen, 24 Arthur St., Guelph, Ont.
Witmer, Mabel, Sub. P.O. No. 2, Victoria, B.C.

Homemaker Course.

(September to December).

Banks, Mary W., Barrington Passage, N.S.
Blayney, Muriel, R.R. 4, Simcoe, Ont.
Bruner, Hazel, R.R. 2, Kingsville, Ont.
Burton, Frances, 11 Spruceside Ave., Hamilton, Ont.
Case, Marion S., 124 Grenadier Rd., Toronto, Ont.
Denney, Arley, 610 Dundas St., London, Ont.
Farmer, Alice, Ancaster, Ont.
Fraser, Adalene, 107 Ontario Ave., Hamilton, Ont.
Harvie, Katherine, R.R. 2, Orillia, Ont.
Hays, Harriet, Goderich, Ont.
Hogle, Gladys, Oshawa, Ont.
Jackson, Elizabeth, 102 Howard St., Toronto, Ont.
Kennedy, Mary, 68 High Park Blvd., Toronto, Ont.
Maxwell, Jean, Leamington, Ont.
Richardson, Katie, St. Mary's, Ont.
Smallman, Frances, 748 King St., London, Ont.
Stephen, Mary, 1085 Queen St., Sault Ste. Marie, Ont.
Strang, A. Janet, R.R. 1, Hensall, Ont.
Sullivan, Helen B., 2210 Longest Ave., Louisville, Ky.
Teeple, Rosa, R.R. 4, Woodstock, Ont.
Vrooman, Josephine H., Napanee, Ont.
Weir, Bessie, Forest, Ont.
Wilkinson, Marion C., 45 Blair Rd., Galt, Ont.
Willmott, Eleanor, 476 Huron St., Toronto, Ont.
Woods, O. Helen, 56 St. Clair Ave. W., Toronto, Ont.
Woods, Kathleen, 56 St. Clair Ave. W., Toronto, Ont.

Short Course in Domestic Science.

(September to December).

Beatty, Beatrice, Garden Hill, Ont.
Buchanan, Eliza., Campbellford, Ont.
Douglass, Ota F., Welland, Ont.
Goad, Marion, 324 Russell Hill Rd., Toronto, Ont.
Jones, Nora M., 599 Russell Hill Rd., Toronto, Victoria, B.C.
Jones, S. Ruth, 599 Island Rd., Oak Bay, Victoria, B.C.
Lawrence, Zella, 24 Avenue Place, Welland, Ont.
Smith, Evelyn, 62 Alexander St., Belleville, Ont.
Spurr, Beulah, Petrolia, Ont.
Wood, Louie, Cambray, Ont.
Young, Edith, Waterloo, Ont.

Optional Students.

(September to December).

Winchester, Minnie E., 77 High Park Blvd., Toronto, Ont.

Student Workers.

(September to December).

Glen, Marion, R.R. 5, Goderich, Ont.
Todd, E. H., Box 663, Collingwood, Ont.

REPORT

OF THE

Ontario Veterinary College

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by A. T. WILGRESS, Printer to the King's Most Excellent Majesty
1917

Ontario Veterinary College, 110 University Avenue, Toronto, Canada.

To His Honour, Sir John Strathearn Hendrie, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of Your Honour the Report of the Ontario Veterinary College, for the year 1916.

Respectfully submitted,

W. H. HEARST,

Minister of Agriculture.

Toronto, 1917.

Report of the Ontario Veterinary College, 1916

To the Honourable JAMES S. DUFF, *Minister of Agriculture, Toronto.*

SIR,—I have the honour to submit the following report of the Ontario Veterinary College for the year ending on the 31st October, 1916.

The number of students in attendance at the College from October, 1915, to November, 1916, aggregated 230 all told. They came from various Provinces and States of North America as well as some other countries. Canada supplied the largest share, viz., 171, the United States came next with 52, and other countries supplied 7. Of the students coming from all Canada more than half of them came from Ontario, there being 94 students from this Province alone.

The continuation of hostilities in Europe seems to have had a rather baneful effect on the attendance at this College, as the number of students are less than they were in the years which antedated the great war.

The College has on its Honour Roll 132 graduates, 16 undergraduates, and 7 of its Faculty in various ranks of the army. Three of our undergraduates were granted leave of absence from the army, and permitted to rejoin their classes in the autumn of 1915, in order that they might graduate in the spring of 1916, after which they returned to the front as commissioned officers.

The continued call for men and more men has caused 52 of our students to join the Officers' Training Corps at the University, where they get a limited amount of instruction in military tactics and drill without interfering with their veterinary studies.

In the month of April, 1916, 76 of our senior class graduated at the closing exercises of the College, and subsequently 9 of them were granted the degree of Bachelor of Veterinary Science (B.V.Sc.) by the University of Toronto, and 19 of them were given commissions in either the Canadian or Imperial Army.

The sudden death of Dr. C. C. James, C.M.G., LL.D., F.R.S.C., in June, caused a loss to the College which is not easy to replace. Shortly after the taking over of the College by the Ontario Government, and its affiliation with the University of Toronto in 1908, Dr. James was elected Chairman of the University Committee on Veterinary Science, and his lively interest in all the affairs of the College since its inception as a Government Institution makes his name long to be remembered by those who are interested in the development of the Institution.

In August, word came from England announcing the sudden death of Dr. T. G. Brodie, M.D., F.R.S., Professor of Physiology both at the University and the Veterinary College.

A monthly brochure published by the University says of Professor Brodie: "It was his ambition to make Toronto a great and renowned School of Physiology." The progress made by him in the short time he was with us leaves little doubt as to the accomplishment of his object had he lived a few years longer.

Dr. Brodie came to us from the Royal Veterinary College of London, England, where he had been a teacher in his special line for many years. He also held some of the most important positions in Physiology that Great Britain had to offer. His method of teaching, his kindly manner, and his strong character leave an imprint at the Veterinary College which will not be easy to forget.

The University was prompt in supplying another teacher to continue the work in Physiology after the death of Dr. Brodie, and the study went on without interruption.

Our system of teaching has not varied much from former years although some courses have been extended and the increased equipment has made others more complete.

During the year the College was allotted space in the Government Building at the Canadian National Exhibition; it was installed with numerous specimens taken from our Museum that illustrated many methods used in teaching Veterinary Science at the College. It seemed to attract a good deal of interest and attention and no doubt advertised the College in a desirable way.

The exhibit consisted largely of anatomical specimens and diseased tissues, together with instruments used in surgical operations. One of the most attractive features of the display was a life size model of a horse which separates into 97 pieces, and shows about 3,000 different points for illustrating Anatomy. It was dissected into numerous parts, and those visitors who were familiar with the anatomy of the horse were struck with the accuracy of the illustrations, while others were greatly pleased to see the internal structures of the animal so clearly demonstrated.

After the usual summer vacation, the College reopened on Monday the 2nd of October, and the following evening the classes met in the assembly hall where they were addressed by President Falconer of the University, by Dr. A. B. Macallum, our new teacher in Physiology, and by Dr. J. G. Fitzgerald, who takes charge of our lecture course in Bacteriology, each of whom made appropriate and instructive addresses. The Principal of the College introduced the speakers, and also made some remarks touching the welfare of students in a general way.

BRIEF SYNOPSIS OF METHODS ADOPTED IN TEACHING VARIOUS BRANCHES OF VETERINARY SCIENCE IN THIS COLLEGE.

Contagious Diseases of Animals.

Will be taught by lectures illustrated with diagrams, diseased tissues, and, when possible, with infected animals.

Veterinary Hygiene.

Taught by lectures illustrated with materials used in promoting health; and observations in the Veterinary Infirmary of the College.

Sporadic Diseases of Animals.

Embracing the various diseases which are not regarded as contagious.

Their causes, symptoms and treatment will be thoroughly described in lectures, illustrated with numerous specimens now in the Museum of the College, also with affected animals as they occur from time to time in the practice of the Infirmary.

Veterinary Anatomy.

Is taught first by descriptive lectures in the class room, and the applied science by a full course of dissection in the commodious laboratory at the College.

Veterinary Surgery.

Will be taught first in the Class Room by illustrated lectures, and the applied science or practical work of the course will be freely demonstrated in an amphitheatre fitted up for the purpose.

Physiology.

Will include a course of about 60 lectures on the physiology of domestic animals, in which the following subjects will be discussed, viz.: The blood and phenomena of clotting; the circulatory mechanism of the heart and blood vessels; physiology of digestion and absorption of foods; chemical characters of different foods; digestive secretions; digestion in different parts of the alimentary tract; respiration and mechanism of the organs concerned; the physiology of ductless glands; neuro-muscular mechanism; the central nervous system; the production of heat in the body and the regulation of body temperature; the central nervous system and functions of the chief parts of the brain; the physiology of the special senses; the physiology of the kidney and other excretory organs.

Veterinary Materia Medica.

Will embrace a description of the most important drugs and agents used in the cure of disease and the alleviation of pain, including their actions, uses, and doses for the various domestic animals. The practical teaching of this branch of the course will be conducted in a suitable pharmacy, as well as in the stalls of the infirmary. The lectures for the first year will be largely directed to the actions and uses of medicines.

Veterinary Pathology.

The course in this subject will extend over two years and will include a series of lectures and laboratory demonstrations, both macroscopic and microscopic.

The lectures are divided so that general pathology is taken up the first year, and the following year is devoted to special pathology.

Gangrene; degeneration; infiltrations; inflammation; tumors; cysts; hypertrophy, atrophy and bone diseases, are some of the subjects which will be discussed.

Veterinary Histology.

Will be taught by illustrated Class Room lectures, all of which will be demonstrated in a spacious room for the purpose, and the student will be required to prepare, mount, stain and examine with the aid of a microscope various tissues in health, including the blood of various domestic animals.

Veterinary Obstetrics.

Will be taught by a full course of lectures, illustrated with large diagrams and numerous instruments used in the practice of this most important art.

Post Mortem Demonstrations.

Will be conducted by descriptive lectures and autopsies, on subjects procured for the purpose, in the amphitheatre of the College.

Bacteriology.

This branch of the College course will receive full consideration through numerous lectures in which special attention will be given to technique in preparing and studying micro-organisms or germs, especially those which are believed to cause disease.

The study of toxins, and the preparation of anti-toxins, vaccines and other biological products will be extensively discussed and demonstrated. An extended laboratory course is given in this subject.

Chemistry.

Will be taught by lectures and a course of laboratory instruction.

Zoology.

Will be taught by illustrated Class Room lectures, and by laboratory methods. Much time will be spent in the study of the Protozoa and the like.

Botany.

Will be taught by lectures in the Class Room. The applied science will be taught by laboratory methods and from specimens in the field.

Parasitology.

Will be taught in the Class Room and the practical features of the subject will be illustrated by specimens, drawings and dissections made by the student in a laboratory equipped for that purpose.

Veterinary Dentistry.

This branch of our course will be fully discussed in illustrated lectures in the Class Room, and the practical education of the student in the art will be fully demonstrated in the amphitheatre.

Zootechnics.

Breeds and breeding of domestic animals, feeds and feeding, live stock judging will be taught by lectures illustrated by diagrams in the Class room, and living animals at famous stock farms in the vicinity of Toronto.

Meat Inspection.

Will be fully taught in the Class Room of the College, and at abattoirs, in a manner which will be in accord with the laws and regulations of Veterinary Science throughout the Dominion.

Horse Shoeing.

Will be fully discussed in the Class Room and practical illustrations of the art will be conducted in the amphitheatre of the College.

Veterinary Jurisprudence.

Will consist of a course of lectures, including a number of subjects which are important to the veterinary surgeon, such as contracts relating to the purchase and sale of live stock, unsoundness and vice in horses or other animals, the straying and impounding of cattle, laws relating to the spread of malignant diseases, laws relating to diseased meats, laws of the road, the law of warranty and kindred subjects.

Dairy Inspection.

Will include lectures in the construction of the dairy barn and milk house; the care of utensils; the handling of milk from the time it is drawn from the cow until it is placed upon the market for sale. Dairy cattle in health and disease, especially those which are communicable to the human family through milk, and various other matters relating to dairy inspection.

Pharmacy.

The instruction given in this course is largely of a practical nature and students are directed in the work by an experienced teacher how to prepare as well as to care for numerous articles or drugs used in the cure of disease.

Introductory lectures are also given in this course.

Embryology.

Is taught by a course of lectures in the Class Room and also a laboratory course, including the practical study of prepared sections of Embryos of different ages.

Milk Inspection.

This course consists of twelve lectures. Normal milk is fully considered in the first two lectures. The remaining lectures are taken up with a description of methods of adulteration, tests for butter fat, description of various products of milk.

Wherever possible, the tests for adulteration, etc., are carried out before the class.

The Calendar of the College contains full instructions for students entering and will be mailed to those who apply for it.

I have the honour to be,

Sir,

Your obedient servant,

E. A. A. Grange,

Principal.

Thirty-Eighth Annual Report

OF THE

Ontario Agricultural and Experimental Union

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:

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1917

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To His Honour Sir John Strathearn Hendrie, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1916.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

Toronto, 1917.

Ontario Agricultural and Experimental Union

OFFICERS FOR 1917.

President ..... H. Sirett, R.R. No. 4, Brighton, Ont.
Vice-President ..... Harvey B. Webster, R.R. No. 1, St. Mary's, Ont.
Secretary ..... C. A. Zavitz, Agricultural College, Guelph.
Assistant Secretary ..... W. J. Squirrell, Agricultural College, Guelph.
Treasurer ..... A. W. Mason, Agricultural College, Guelph.
Directors ..... Dr. G. C. Creelman, Hon. Nelson Monteith, P. S. McLaren, A. H. McKenney, Norman James.
Auditors ..... R. R. Graham and S. H. Gandier.

COMMITTEES ON CO-OPERATIVE EXPERIMENTAL WORK.

Agriculture ..... C. A. Zavitz (Director), W. J. Squirrell, A. W. Mason, C. R. Klinck and A. E. Whiteside.
Bee-Keeping ..... Morley Pettit (Director), Geo. F. Kingsmill, and W. B. Angle.
Forestry ..... E. J. Zavitz (Director), A. H. Tomlinson and H. A. Dorrance.
Agricultural Chemistry ..... R. Harcourt (Director), J. W. Crow and A. L. Gibson.
Agricultural Botany ..... J. E. Howitt (Director), T. G. Raynor, W. J. Lennox and Herbert Groh.
Bacteriology ..... D. H. Jones (Director), G. E. Day and Herbert Groh.

TREASURER'S REPORT, 1916.

Receipts.		Expenditures.	
Balance from last year	$1,515 67	Agricultural experiments	$1,752 27
Government grant	2,750 00	Apicultural experiments	486 42
Membership fees, 224 at 50c. ..	112 00	Botanical experiments	26 00
Bank interest	66 78	Part expenses, annual meeting, 1916	105 00
		Advertising, annual meeting, 1917	151 00
		Meeting of executive	17 65
		Total	$2,538 34
		Balance on hand	1,906 11
	$4,444 45		$4,444 45

Ontario Agricultural and Experimental Union

ANNUAL MEETING

The thirty-eighth annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Tuesday and Wednesday, January 9th and 10th, 1917. A banquet was held on Tuesday night in the new Dining Hall at the College when about three hundred officers, ex-students and students were seated at the tables. Dr. Creelman, President of the College, Rev. Canon Cody, of Toronto, and several of the ex-students of the College gave short addresses. On Tuesday two sessions, and on Wednesday, three sessions of the Experimental Union meeting were held. All the sessions convened in Massey Building. Some of the sessions were crowded beyond the seating capacity of the hall. The reports and addresses which were presented, and the most important discussions which took place during the different sessions of the Experimental Union meeting, are embodied in this report.

SECRETARY'S REPORT.

DR. C. A. ZAVITZ, PROFESSOR OF FIELD HUSBANDRY, O.A.C., GUELPH.

The Ontario Agricultural and Experimental Union was organized in 1879, and the co-operative work, under the present plan, has been in operation since 1886. Not only does the organization give an opportunity for the ex-students to return to the College and renew old acquaintances and form new ones, but it is also one of the active agencies in the advancement of progressive agriculture in the Province. It has the backing and the enthusiastic co-operation of thousands of farmers throughout the Province who have never been connected with the College. In agriculture alone there have been no less than 84,305 distinct tests made throughout the Province. Each of these experiments has consisted of from two to ten plots. The increase in the number of experimenters in agriculture can be seen from the following figures which show the average yearly number actually engaged in the work in four periods during which the experiments have been in operation:

Periods.	Years.	Average number of Experimenters per Annum.
1886–1893	8	315
1894–1901	8	2608
1902–1909	8	3882
1910–1916	7	4280

Owing to scarcity of labor and unfavorable weather conditions, the number of experimenters in 1916 was only 3,235. The co-operative experiments of the past year, however, have furnished valuable results which should assist in the betterment of crop production in Ontario.

Since our last meeting, co-operative experiments have been conducted throughout Ontario with varieties of farm crops, quantities of seed per acre, mixed grains for hay production and for fodder, the application of commercial fertilizers and manures, the eradication of weeds, the reforesting of waste places, beekeeping in Ontario, etc.

There were three meetings of the Board of Control of the Experimental Union held during the year. Two of these were held in January and one was held in September.

The Annual Report of the Experimental Union was published by the Ontario Department of Agriculture and distributed from Toronto to about thirty thousand experimenters and other farmers. We are indeed grateful for the hearty co-operation of the public press in bringing the results of the co-operative experiments so prominently before the reading public. At our last annual meeting, practically all of the agricultural journals and the agricultural departments of the daily papers were represented by able reporters.

In each of the past two years the weather conditions in Ontario have been abnormal and the results of the experiments, therefore, have a peculiar interest and, in some instances, a special value. Caution should be taken not to draw definite and permanent conclusions from the results of the past two years. In comparing these results, however, with those of other years they are of special importance and in many cases are quite suggestive.

Not only the Experimental Union as an organization, but the farmers as a whole, are under obligations to the co-operative experimenters who carried on the work successfully during the past year and have furnished results which are not only of value to themselves but of service to the whole country. These men are doing a noble work in the Province as each experiment forms a centre for the distribution of good seed and of practical information. All carefully conducted experiments have their own peculiar lessons and are worthy of careful study. We believe that this work which has had a steady and substantial growth from the beginning has yet an important mission to fill in connection with the agricultural advancement of the Province of Ontario.

PRESIDENT'S ADDRESS.

J. B. Fairbairn, Beamsville.

I am delighted to see such a splendid attendance at this the first session of our thirty-eighth Annual Convention. This is our third meeting since the declaration of war in Europe, and I trust that these sessions may prove the most profitable from a personal and a national standpoint. The production of foodstuffs the world over is one of the thoughts uppermost in every one's mind, and we have arranged our programme with this as a basis. Busy men actively engaged in various pursuits of agriculture, commerce and education have graciously accepted invitations to be present and address you, and I am personally delighted to have the honor of presiding at meetings which purport to be of such interest and profit.

Canadian people have yet to learn what sacrifice means, and they will have to practise economy and thrift to a much greater degree than heretofore if we are to do our just share in winning the war. Each dollar of money, every hour of working time, every revolution of every engine, and every ray of sunshine should be used and spent to assist in winning the war. We are individually spending money daily upon luxuries which should go toward maintaining and equipping our

armies. We cannot continue spending recklessly on luxuries and on war too. As yet we have not had compulsion to fight, and whether we shall or not we can each, personally, have compulsion to work at something which our Government regards as useful. Thousands of men are to-day engaged in supplying Canadian people with luxuries. If the Government would divert this energy and man labor into useful channels the net result would be more men for the army, more products from the farm, more munitions manufactured, and more money saved with which to finance this great task. Millions of dollars last year were spent on imported American fruits, and millions were spent in luxurious restaurants, in high grade candy, theatres, flowers, etc. Three hundred and eighty-five thousand of our best men have made great sacrifices. Many of them have been called upon to make the supreme sacrifice, and they have done it gallantly and nobly. But as for us, what sacrifices have we made? We have subscribed to patriotic funds of various kinds, to Canadian Government War Loan probably, but we have not yet begun to deprive ourselves of numerous luxuries and to divert such waste into channels which will hasten the day of ultimate victory for us. If we continue as we are now doing we must of necessity borrow large sums of money from outside sources, and these obligations we shall be forced to hand on to posterity, whereas by the practice of economy and sacrifice, our superfluity of productiveness, if devoted entirely to carrying on the war, would finance our fighting as we go. We know now that this is a contest of endurance and efficiency, but we, in Canada, have not yet begun to try to be efficient or to make provision for enduring. In every belligerent country in Europe individual liberty has been cheerfully surrendered for the duration of the war, and every man, woman and child is laboring in the interests of the state as their capacities permit. We, in Canada, are a belligerent country, but we are next door to the greatest and richest and most self-contented of neutrals, and I am not sure but what we are acting as though we thought that the position of that neutral was a proper condition for us to imitate. The following words by Mr. Lloyd George are very pertinent at this time, and should be carefully considered by Canadian people: "There is no faltering in our determination that the sacrifices which we and you have made and have still to make shall not be in vain, and that the fight which we are waging together for humanity and civilization shall be fought to a triumphant issue. We realize that we shall still need every man that we can put in the field, every pound that rigid private and public money can provide, and every effort which a united people can put forth to help in the heavy task of our soldiers and sailors."

I contend, therefore, that we must not be content with the part we play in production, but that in addition to this we must deprive ourselves of everything other than necessities—that we practise the most rigid economy and that we make every effort which is in our power to hasten the triumphant issue which we so earnestly and sincerely desire.

Mr. Sirett: I find it somewhat difficult to decide just what one should be prepared to say at these meetings, because I feel that we have two classes of agriculturists in the audience. There are the young men graduates, those who have attended only a few conventions, and there are the older men who have attended these meetings for many years. Times have changed a great deal since these older men left the College. The President, in his address, touched a number of important questions, and one of the most important of these is the question of the production of foodstuffs. In spite of all that has been said regarding the necessity of doing certain things at the present time, is there anything quite so important as the production of foodstuffs? I know the difficulties which farmers face in a situa-

tion such as we have to-day. Agriculturalists have to contend with difficulties which no other class of producer has to meet; they have to compete in the labor market with the manufacturer; with men who have a highly organized system, and who have a fixed price for their output before they commence to produce. These men are able to pay a price for their labor beyond that which farmers are able to pay and run the business profitably, because the price which they pay for sufficient labor of the kind they want is calculated in their price for the finished product. I do not think the farmers of Ontario ever had such an unfortunate season as that of 1916, and in view of this I do not think it would be just to lay too heavy a burden on the farmer in 1917. A great many farmers have not the time to work their land properly; they have had to work with less labor than they have had in previous years, but with greater expectations on the part of the public for increased production. In spite of these handicaps, if we are to do what we think is right, we will have to admit that it is up to us to do our very utmost to increase production. A great deal has been said as to why the farmer can produce more. I do not believe that ever in the history of Canada has the farmer had so many labor saving implements and devices to help him as he has at the present time. Among these labor saving inventions there are a great many which promised to do much but which have not yet been able to take the place of horse and hand labor. The scarcity and high price of labor in the last few years is responsible, I think, for a very large number of co-called labor saving devices that have sprung into existence and have been placed on the market. Many of you attended the farmers' gathering at Pickering last fall. Farmers who attended that gathering had been looking forward with a great deal of anxiety to the development of a small farmer's tractor. I know I have heard numbers of farmers say that if a useful tractor could be put on the market at a reasonable price it would fill a very great need. We have on the farms of Ontario as a rule a greater number of horses than are immediately needed in order that we may be able to take care of a lot of work at the proper time. At the same time we have many occasions to use power on the belt and pulley which cannot be supplied by horse power. When we have a tractor that will take the place of a lot of the work now done by the horse, and at the same time can be used for work on the belt and pulley, it will help solve the question of labor, and will relieve the farmer from keeping a large number of horses, which, at the present time it is necessary he should keep in order to be ready for a busy season. I do not mean by this that the horse that is working six or eight months in the year can be replaced by any other kind of power, but the horse that is only working two or three months in the year can certainly be replaced by some kind of motor power to advantage.

Then there is another matter on which I feel keenly, and which was touched on by the President—the time given to manufacturing of what seems to me in a great many cases to be luxuries. I live not very far from the town of Oshawa where they have a number of manufacturing establishments, and have taken almost every man who could be seduced from his own neighborhood to their factory. In the case of munition workers it has become a necessity, but in a great many other cases I could cite it falls within the category of luxuries. Never in the history of Ontario, in fact I may say in the history of Canada, have so many people bought automobiles as was done in 1916, a very large percentage being bought simply for recreation. I think that the Government would do well to curtail the manufacture of such articles as come within the meaning of luxuries, so that more men could be spared for the manufacture of necessities, and the production of the all important foodstuffs.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

Dr. C. A. Zavitz, Professor of Field Husbandry, O.A.C., Guelph.

In each of the past thirty-one years a committee has been appointed by the Experimental Union to plan and carry forward co-operative experimental work in agriculture. A committee appointed last year to look after this branch of the work for 1916 were as follows: C. A. Zavitz (Director), W. J. Squirrell, A. W. Mason, C. R. Klinck and A. E. Whiteside. It devolves upon me, as Director of this Committee, to present a report of the work which has been accomplished during the past year. We had in all thirty-seven distinct and separate tests, six being with autumn and thirty-one with spring sown crops. To furnish definite information and an outline of the work, a copy of the lists of experiments which was forwarded to ex-students and other farmers is here presented.

Winter Crops, 1915-1916.

Material for any one of the six experiments here mentioned will be sent free to any Ontario farmer applying for it, if he will conduct an experiment with great care and report the results after harvest next year. The seed will be sent out in the order in which applications are received as long as the supply lasts.

	Plots.
1. Testing three leading varieties of Winter Wheat	3
2. Testing one leading variety of Winter Rye and one of Winter Wheat	2
3. Testing Spring Applications of five Fertilizers with Winter Wheat	6
4. Testing Autumn and Spring Applications of Nitrate of Soda and Common Salt with Winter Wheat	5
5. Testing Winter Emmer and Winter Barley	2
6. Testing Hairy Vetches and Winter Rye as Fodder Crops	2

The exact size of each plot is to be one rod wide by two rods long. The material for experiments Nos. 1, 2, 3, 5 and 6 will be forwarded by mail, and for the other one by express. Each person wishing to conduct one of these experiments should apply as soon as possible, mentioning which test he desires, and the material, with instructions for testing and the blank form on which to report, will be furnished free of cost until the supply of experimental material is exhausted.

Spring Crops, 1916.

The members of the Ontario Agricultural and Experimental Union are pleased to state that for 1916 they are prepared to distribute into every township of Ontario, material for experiments with fodder crops, roots, grains, grasses, clovers and fertilizers. Fully 2,500 varieties of farm crops have been tested in the Experimental Department of the Ontario Agricultural College, Guelph, for at least five years. These consist of nearly all the Canadian sorts, and several hundred new varieties and new strains, a few of which have done exceedingly well in the carefully conducted experiments at the College, and will be used for the co-operative experiments throughout Ontario in 1916.

Each person in Ontario who wishes to join in the work may choose any one of the experiments for 1916, fill out the accompanying form of application, and return the same to the Director of the Co-Operative Experiments in Agriculture at as early a date as possible. The material will be furnished in the order in which the applications are received, until the supply is exhausted. A sheet containing the instructions for conducting the chosen experiment, and the blank form on which

to report the results of the work, will be sent to each experimenter at the time the fertilizers or seeds are forwarded. All material will be furnished entirely free of charge to each applicant and the produce of the plots will, of course, become the property of the person who conducts the experiment. In return, the Committee on Agricultural Experiments desires to ask that each experimenter will sow all the plots belonging to the particular experiment which he has chosen for 1916, and that he will be very careful and accurate in his work, and forward to the Director a complete report of the results obtained from the test, as soon as possible after the plots are harvested.

All seeds and fertilizers will be sent in good time for spring seeding, providing the applications are received at an early date. The supply of material being limited, those who apply first will be surest of obtaining the desired outfit. Each applicant should make a second choice, in case the first could not be granted. The experiment selected should be indicated by using its number as given in the left hand column in the lists of experiments. Further information is given on the application form which is attached.

List of Experiments for 1916.

Grain Crops.

	Plots.
1. Testing two varieties of Oats	2
2*a*. Testing O. A. C. No. 21 Barley and Emmer	2
2*b*. Testing two varieties of Two-rowed Barley	2
3. Testing two varieties of Hulless Barley	2
4. Testing two varieties of Spring Wheat	2
5. Testing two varieties of Buckwheat	2
6. Testing three varieties of Field Peas	3
7. Testing two varieties of Spring Rye	2
8. Testing two varieties of Soy, Soja, or Japanese Beans	2
9. Testing seven varieties of Husking Corn	7

Root Crops.

10. Testing three varieties of Mangels	3
11. Testing two varieties of Sugar Beets for feeding purposes	2
12. Testing three varieties of Swedish Turnips	3
13. Testing two varieties of Fall Turnips	2
14. Testing two varieties of Carrots	2

Forage, Fodder, Silage and Hay Crops.

15. Testing the planting of Corn at six distances in the row	6
16. Testing three varieties of Millet	3
17. Testing two varieties of Sorghum	2
18 Testing Grass Peas and two varieties of Vetches	3
19. Testing Rape, Kale and Field Cabbage	3
20. Testing three varieties of Clover	3
21. Testing two varieties of Alfalfa	2
22. Testing four varieties of Grasses	4

Culinary Crops.

23. Testing three varieties of Feld Beans	3
24. Testing two varieties of Sweet Corn	2

Fertilizer Experiments.

25. Testing fertilizers with Potatoes	6
26. Testing fertilizers with Mangels	10
27. Testing fertilizers with Rape	5

MISCELLANEOUS EXPERIMENTS.

28. Testing two varieties of Potatoes	2
29. Testing three grain mixtures for Grain production	3
30. Testing three grain mixtures for Fodder production	3

The size of each plot in each of the first twenty-seven experiments and in Nos. 29 and 30 is to be two rods long by one rod wide; in No. 28 one rod square.

If you wish to conduct one of the thirty agricultural experiments named on the accompanying circular, kindly fill out this blank and return it as soon as possible.

The distribution will be confined to the choice varieties included in the various experiments. In filling out the blank form, therefore, it is neither necessary nor advisable to mention any particular variety or varieties.

Material for experiments numbered 25, 26 and 27 will be sent by express, and that for each of the others by mail.

APPLICATION FOR MATERIAL FOR AN EXPERIMENT.

I would like to conduct experiment number ..... but if all the material for that experiment has been applied for before my application is received I select experiment number ..... as my second choice. If the material for one of these experiments is forwarded to me, I will endeavor to:

1. Carry on the test according to the instructions received with the seed.
2. Exercise care and accuracy in the work, and
3. Report the result of the experiment as soon as possible after harvest whether successful or not.

Owing, undoubtedly, to the scarcity of labor throughout the rural sections of Ontario, the number of applications for experimental material was somewhat lower than usual, but even in spite of this a large number of farmers took up the work enthusiastically.

The past two years have been abnormal for crop production in Ontario. There was an exceedingly large amount of rainfall in the latter part of 1915 and also in the early part of 1916. For the ten months from January to October, 1916, the precipitation for Ontario was 29.7 inches or 3 inches above the average. The rainfall in the month of May was particularly high and that of July and August was much below the average.

At the Ontario Agricultural College, weather conditions were somewhat similar to those throughout Ontario. The following information has been secured from the Department of Agricultural Physics and gives the amount of rainfall for each month from April to September for 1915, for 1916 and for the average of the past seventeen years:

Months.	1915.	1916.	Average 17 years.
April	2.23	3.53	2.30
May	2.24	4.41	2.80
June	2.27	4.46	2.51
July	5.87	1.21	3.42
August	6.16	1.68	2.88
September	3.92	1.83	2.39
Total 6 months	22.69	17.12	16.30

The tabulated results here presented show quite clearly the abnormal conditions of rainfall in each of the past two years. It will be observed that the total amount of rainfall for each of the months of July and August in 1915 and for May and June for 1916 was exceptionally large, and also that the rainfall for each of the months of July, August and September of the past season has been much below the average.

The results of experiments in the past year, therefore, have peculiar interest, but care is necessary in order to avoid drawing wrong conclusions from these results.

The various experimenters conducted the tests according to instructions furnished them and reported the results of their individual experiments on blank forms which were sent along with the seed. The reports of the co-operative experiments for 1916 which were received at the College were submitted as usual to a very critical examination. For the summary report which is presented at this time only those reports which show carefulness and reliability throughout were used. Many of these reports have been furnished by men who have had a large amount of practical experience on the farm, have had the advantage of a good education and have had a careful training in experimental work as they have conducted successful tests on their own farms in each of a number of years. It should be clearly understood that, while only the good reports of carefully conducted experiments have been used for publication, many of those not included in the summary report show that the individual experimenters must have obtained a considerable amount of valuable information from their work and, in each of a number of cases, a start with choice seed of varieties particularly suited to their own local conditions. It occasionally happens that, owing to some accident, an experiment may have been injured so that the results could not be used in the summary report, but the experiment may have given useful lessons to the farmer conducting the test and sometimes to other farmers in the vicinity. It is certainly true that experimenters obtain much more information from the experiments which they conduct in addition to that included in the summary report such as the one here submitted.

Each experimenter received instructions for conducting the co-operative work and was asked to give his decision as to the relative standing of the different varieties, mixtures, quantities of seed, fertilizers, manures, etc., after everything had been taken into consideration. The report here presented includes a summary of the answers of this line of inquiry and this is presented in the tabulated results under the heading of comparative value.

Varieties of Farm Crops.

There are now too many varieties of nearly all classes of farm crops grown in Ontario. It is the aim of the Experimental Union to assist the farmers of Ontario in growing a comparatively few of the best varieties to the exclusion of many of the poorer kinds which are now grown to a limited extent. The number of varieties distributed for the co-operative work is kept as low as possible and only those are used which have been thoroughly tested for a series of years in the trial grounds at the Ontario Agricultural College. The Experimental Union is actively engaged with those crops which are now used on about ninety per cent. of the cultivated land of the Province. Some of the varieties which are now being extensively used in cultivation are those which were introduced by or originated at the College and, after proving their worth, were distributed and used for the co-

operative experimental work on different farms throughout the Province. Some varieties do particularly well over nearly the whole of Ontario while others do the best on soil of a special kind and not so well on soil of a different character. The co-operative experiments give an opportunity for the farmers to glean information as to the best of the leading kinds for their own particular farms. We believe the number of varieties is becoming gradually less and that the farmers are concentrating more and more on a few of the superior sorts. The barley crop has become practically uniform throughout the Province as it is now nearly all either Mandscheuri or O.A.C. No. 21 which is grown, with evidently a large preponderance of the latter. The O.A.C. No. 72 oats are also increasing very rapidly and the Marquis spring wheat is becoming a favorite in many localities. In pointing out a few of the best varieties of grain and of other farm crops, the results here presented should prove of much service. We are pleased to submit the tabulated returns of the different varieties of grain crops tested throughout the Province during 1916, and, even though the tests were made in a severe season the results, if studied with good judgment, should prove of real service.

In the tabulated results here presented, attention is called to the fact that the figures in the third column under "Comparative Value" are made up from the answers received from the experimenters after the farmers who conducted the experiments had taken everything into consideration.

Experiments.	Varieties.	Comparative value.	Yield per Acre.		
			Straw (tons.)	Grain (bus.)	Grain (lbs.)
Oats (46 tests)	O. A. C. No. 72	100	1.40	47.04	1,599
	O. A. C. No. 3	73	1.28	45.60	1,550
Six-rowed Barley and Emmer (4 tests)	O. A. C. No. 21	100	1.13	25.42	1,220
	Common Emmer	81	1.23	22.50	1,080
Hulless Barley (15 tests)	Black Hulless	93	.88	25.91	1,554
	Guy Mayle	100	.82	25.47	1,528
Spring Wheat (9 tests)	Wild Goose	100	1.32	20.37	1,222
	Marquis	100	1.26	17.19	1,031
Winter Wheat (11 tests)	Imperial Amber	100	1.98	39.08	2,345
	Banatka	67	1.70	33.36	2,002
	American Banner	76	1.62	32.37	1,942
	Yaroslaf	50	1.48	32.37	1,942
	Crimean Red	59	2.12	31.73	1,904
Spring Rye (2 tests)	O. A. C. No. 61	100	2.22	42.14	2,360
	Common	67	1.86	36.43	2,040
Field Peas (29 tests)	Potter	100	1.21	22.52	1,351
	Canadian Beauty	85	1.18	22.31	1,338
	Early Britain	65	1.13	20.77	1,246
Field Beans (7 tests)	Pearce's Improved Tree	100	1.42	22.09	1,326
	Yellow Eye	85	1.54	16.95	1,017
	Common Pea	80	.98	14.45	867
Soy Beans (2 tests)	Brown	100	.40	14.67	880
	O. A. C. No. 81	100	.28	13.67	820

In the fourth column of the tabulated results, the yield of straw per acre represents the total crop less the amount of grain and, therefore, includes the chaff with the straw. The yield of grain is given in pounds as well as in bushels per acre in order that the results may be very clearly understood and that certain comparisons may be made between the different classes of crops as well as between the varieties of each class. Definite comparisons can be made between the varieties of each class of farm crops as they were grown on the same farms and under similar conditions. Caution should be exercised, however, in comparing one class of farm crop with another as it should be understood that these have been grown on different farms. In cases where there are a considerable number of tests of each class, however, certain comparisons might be made regarding the yields of different classes. Owing to the great variation in the weight per measured bushel in different crops, it is easier to compare the results in pounds than in bushels per acre. It should be understood that in working out the number of bushels per acre, the standard weights per measured bushel have been used for each class of crop.

Varieties of Oats.—The value of the Ontario oat crop now amounts to approximately fifty million dollars annually. This is about one-quarter of the value of all the field crops grown in the Province; slightly over one-half the value of the horses, cattle, sheep, lambs, swine and poultry of all classes which are sold or slaughtered annually and double the value of the cheese and the butter manufactured in the factories and in the creameries of Ontario each year.

Realizing the value of the oat crop to the Province, special attention has been given at the Ontario Agricultural College to breeding varieties which would give more satisfactory returns than those already in cultivation. About three hundred varieties have been imported from different countries and carefully grown under uniform conditions in the experimental grounds. Efforts have been made to improve the best varieties by means of plant selection and by cross-fertilization. For fuller information regarding this work, the reader is referred to Bulletin No. 228 on "Farm Crops" issued in 1915, copies of which can be obtained from the Department of Agriculture, Parliament Buildings, Toronto.

Two varieties started at the College have made excellent records both in our own trial grounds and in the co-operative experiments throughout the Province. It is believed that the O.A.C. No. 72 variety of oats which requires the same length of time to mature as the Banner will soon supplant practically all of the other varieties of late oats in the Province.

The O.A.C. No. 72 variety of oats was started from a single seed in 1903 and the O.A.C. No. 3 variety from a single seed in 1904. These two varieties have been carefully tested at the College with other varieties of oats in each of the past ten years. The following table gives the percentage of hull and the yield of grain per acre of the O.A.C. No. 3 and the O.A.C. No. 72 in comparison with the Daubeney and the Banner varieties in each of the past ten years:

Years.	Percentage Hull.				Bushels per Acre.			
	Early.		Late.		Early.		Late.	
	Daubeney	O. A. C. No. 3.	Banner.	O. A. C. No. 72.	Daubeney	O. A. C. No. 3.	Banner.	O. A. C. No. 72.
1907.....	24.7	24.7	28.3	27.2	80.79	86.29	65.94	76.38
1908.....	23.8	23.6	28.6	25.4	88.97	89.24	83.50	86.82
1909.....	25.4	24.8	29.6	28.7	98.35	104.88	70.41	102.94
1910.....	24.9	24.4	29.6	28.6	87.00	90.35	73.62	93.59
1911.....	26.2	25.0	31.3	27.8	42.12	49.76	30.41	43.97
1912.....	24.6	23.8	35.5	28.0	76.47	91.65	73.44	114.12
1913.....	24.5	23.0	29.2	25.6	60.41	94.12	74.38	105.74
1914.....	25.9	24.3	30.7	28.9	63.88	57.53	88.00	88.50
1915.....	23.7	21.7	29.1	28.4	73.21	76.00	92.76	103.53
1916.....	27.9	26.0	33.5	32.3	53.57	61.46	51.32	58.53
Average 10 years.....	25.2	24.1	30.5	28.1	72.48	80.13	70.38	87.41

It will be seen that in almost every instance the O.A.C. No. 72 surpassed the Banner and the O.A.C. No. 3, the Daubeney in both quality of grain and yield of grain per acre.

In the year 1911 the O.A.C. No. 72 variety of oats was first distributed for co-operative experiments throughout Ontario. One pound lots were sent in that year to three hundred Ontario farmers who applied for the co-operative experiment with oats through the medium of the Experimental Union. The one pound of O.A.C. No. 72 oats was compared with two or three other leading varieties on plots one rod wide by two rods long. The new variety did so well in the first year that a large number of farmers saved their seed very carefully and sowed it on larger plots in 1912.

In 1913 one farmer entered his O.A.C. No. 72 oats in the Field Crop Competition and took first prize. In 1914, twenty; and, in 1915, forty-eight first prizes were awarded by the judges for fields of O.A.C. No. 72 oats throughout Ontario in connection with the Field Crop Competitions. In comparison with the forty-eight first prizes taken by the O.A.C. No. 72 oats in 1915, thirty-three first prizes were taken by the Banner and forty-five first prizes by all other varieties combined.

In connection with the Provincial Winter Fair held annually at Guelph, the O.A.C. No. 72 oats had five entries in 1913, thirty-six entries in 1914, fifty-seven entries in 1915 and seventy-one entries in 1916, and the Banner had twenty-one entries in 1916 and an average of twenty entries in each of the past five years. At the Provincial Winter Fair held in December the O.A.C. No. 72 oats took first prize in the Field Crop Competition open to all varieties of white oats and took the Championship Premium for the best oats at the exhibition. The Championship bag of oats was sold at auction for eleven dollars.

An American seed firm recently changed the name of the O.A.C. No. 72 oats to that of Imperial and sold the seed through agents in Ontario and in the United States for upwards of three dollars per bushel, when our own farmers had thousands of bushels of first-class seed of O.A.C. No. 72 oats which they were selling at from seventy-five cents to one dollar and fifty cents per bushel.

The O.A.C. No. 72 and the O.A.C. No. 3 varieties of oats have been tested

over Ontario in each of the past four years, the average in bushels of grain per acre for the former being 51.1 and for the latter 46.8 bushels per acre. In each of the four years the O.A.C. No. 72 surpassed the O.A.C. No. 3 in yield of grain. The latter named variety, however, is thinner in the hull and is ten days earlier in maturing than the former, and is particularly well suited for growing with barley when the two kinds of grain are grown in combination for grain production. In yield of straw per acre the O.A.C. No. 72 usually surpasses the O.A.C. No. 3 by an average of about two-fifths of a ton.

O.A.C. No. 21 Barley and Common Emmer.—It is unnecessary to do more than to draw attention to the O.A.C. No. 21 variety of barley. This barley is now grown to the exclusion of nearly all other varieties. At the Provincial Winter Fair there were about forty lots of barley entered in each of the past two years, but not one named variety was entered except the O.A.C. No. 21. The annual increase in the barley crop in Ontario arising from the actual increase in bushels per acre, largely due to the introduction of better varieties, is about twelve times as great as the entire cost of the maintenance of the Ontario Agricultural College.

The O.A.C. No. 21 variety of barley was started in the Field Husbandry department at our College from a single seed in 1903. This barley possesses a good length of straw which is particularly strong in comparison with most other varieties. The heads possess six rows of grain and are bearded. The grain is white on the outside but is of a bluish color immediately under the hull. So far the crop has been comparatively free from rust. The weight of the grain per measured bushel has been somewhat over the standard and the yield per acre has been heavy. The O.A.C. No. 21 barley was distributed throughout Ontario in connection with the Experimental Union about nine years ago for the first time and it has made a very excellent record. In each of four years in which it was compared with the Mandscheuri in the co-operative experiments throughout the Province, it surpassed the latter in yield of grain per acre, in freedom from rust and in both length and strength of straw. From the one pound lots of the O.A.C. No. 21 barley which have been distributed through the medium of the Experimental Union, this variety has increased very rapidly over the Province. In each of the past four years it has been distributed along with Common emmer for co-operative experiments. Common emmer is a type of spring wheat which does not make a clear separation of grain and chaff in the process of threshing. Both the hull and the grain are ground together as in the case of oats or barley for feeding to farm stock. Common emmer proved to be a keen competitor with barley and with oats in grain production. The results, therefore, obtained through the medium of the Experimental Union should prove interesting and valuable.

In the average results of the co-operative experiments with O.A.C. No. 21 barley and Common emmer, it will be seen that the former gave 1,220 and the latter 1,080 pounds per acre, and that, of the two grains the barley was the more popular. In the average results of the co-operative experiments for four years in which there were in all seventy-three separate tests, the O.A.C. No. 21 barley gave 1,642 and the Common emmer 1,326 pounds per acre or a difference of 316 pounds per acre in favor of the barley.

Hulless Barley.—Although the interest in Hulless barley is not as great as it was a few years ago, there is still a considerable demand for experimental material with this crop. We have tested out at the College about fourteen different varieties of Hulless barley, but there are not many of them that prove satisfactory for cultivation in Ontario. In each of the past thirteen years, we have distributed the Guy Mayle and the Black Hulless varieties for co-operative tests.

In the average for the whole period of thirteen years in which there were 168 separate tests, we find that the Guy Mayle gave 24.1 and the Black Hulless 23.1 bushels per acre. In 1916, however, it will be seen that the Black Hulless gave about one-half bushel per acre more than the Guy Mayle. In popularity, however, the Guy Mayle somewhat surpassed the Black Hulless.

Spring Wheat.—In each of the past two years, increased interest has been aroused in spring wheat production owing to the high price of wheat brought about through the war in Europe and through the partial failure of the wheat crop in some of the countries in the past year. In each of the past four years, we have distributed the Marquis variety of spring wheat along with the Wild Goose variety. In the average of the four years' results including in all 62 separate tests, the Wild Goose gave 20 and the Marquis 18.7 bushels per acre. In 1916 in the average of 9 tests, the Wild Goose gave 20.4 and the Marquis 17.2 bushels per acre. The Marquis wheat is a superior variety for flour production and was originated by Dr. Saunders of Ottawa.

Winter Wheat.—Five varieties of winter wheat were again distributed in the fall of 1915. The results of this experiment as well as those of other autumn sown crops were prepared for publication in August of the present year and were sent to about four hundred of the newspapers and agricultural journals of Ontario. This enabled the farmers to learn the results of the tests conducted both at the College and throughout Ontario with the autumn sown crops, before the time for seeding in the latter part of August and in September.

As the five varieties of winter wheat found in the tabulated results have been distributed for co-operative experiments in each of the past three years, it is interesting to know the average yields for the three-year period which includes 58 separate tests and which are as follows: Imperial Amber, 33.3, Banatka, 31.2, American Banner, 31.2, Yaroslaf, 29.9, and Crimean Red, 29.3 bushels per acre. The Banatka, which stands second in the results for 1916 and which occupies second place in conjunction with the American Banner in the three-year period, is a red wheat of very excellent milling quality.

Buckwheat.—Three varieties of buckwheat were distributed in the spring of 1916 for co-operative experiments, but, owing to the abnormal weather conditions, no good reports of satisfactorily conducted experiments were received. In the average of seven years' results previous to 1916, the Rye buckwheat gave 25.3 and the Silver Hull 20.5 bushels per acre per annum. The last named variety is the one most extensively grown throughout Ontario according to the reports of experimenters.

Spring Rye.—In each of the past six years, the O.A.C. No. 61 variety of spring rye has given the highest yield of grain per acre in the co-operative experiments. The average yield per acre per annum for the six years was 25.1 bushels for the O.A.C. No. 61 and 21.8 bushels for the Common. In 1915 and again in 1916, the O.A.C. No. 61 surpassed the Common variety by an average of 5.7 bushels per acre. Of all the varieties of spring rye which we have grown, the O.A.C. No. 61 has given the best satisfaction at Guelph and has been the most popular and most productive variety in connection with the co-operative experiments.

Winter Rye and Winter Wheat.—In the autumn of 1914 and again in 1915, the Petkus winter rye and the Imperial Amber winter wheat were distributed for co-operative tests. The average results show that the Petkus rye surpassed

the Imperial Amber winter wheat by an average of 380 pounds per acre in 1915 and by 344 pounds in 1916. In the experiments at the College, the Petkus has surpassed all other varieties of winter rye in the average results of the past five years.

Field Peas.—There has been an unusual demand for the experiment with Field Peas in each of the past two years. This was brought about undoubtedly by the high price of peas, the demand for concentrated food for home use and for export and by the encouragement given to the growth of field peas as well as field beans in Ontario. For co-operative experiments in 1916, three varieties, viz.: the Canadian Beauty, a large white smooth pea; the Early Britain, a brown dented variety and the Potter, a smooth pea of large size, were used. The average results of good reports of twenty-nine successfully conducted experiments show a yield of about one-fifth of a bushel per acre in favor of the Potter as compared with the Canadian Beauty variety. The Early Britain dropped to the bottom of the list with an average of about seven pecks per acre below the Potter variety. The Canadian Beauty and the Early Britain varieties have been included in the co-operative experiments in each of the past fifteen years, the average yield per acre for the former being 24.1 and for the latter 24.0 bushels per acre. It will, therefore, be seen that these two varieties have given very similar results in yield of grain per acre when the whole period of fifteen years is taken into consideration.

Field Beans.—As in the case of peas, the demand for field beans for co-operative experiments has been quite large in each of the past two years. The average price paid for beans in Ontario for the thirty-two years previous to 1914 was $1.25 per bushel and that for the average of the years 1911, 1912 and 1913 was $1.84 per bushel. In January, 1915, the Government of Ontario paid approximately $2.50 per bushel for several carloads of beans for shipment to the Belgians. In March, 1915, the commercial beans of Ontario were selling for about $3.00 per bushel. In the latter part of 1916, the price of beans advanced to upwards of $6.00 per bushel in Ontario.

In the spring of 1916, three varieties of beans were distributed for co-operative experiments. The Pearce's Improved Tree bean came at the head of the list with an average of 22.1 bushels per acre, the Yellow Eye second with 17.0 bushels per acre and the Common Pea last with an average of 14.5 bushels per acre. The Pearce's Improved Tree bean has been used in the co-operative experiments in each of the past four years. In comparison with the Pea bean for the same period, the former gave 25.4 and the latter 23.5 bushels per acre. In the average of the co-operative experiments over Ontario for three years, the Pearce's Improved Tree gave 26.5 bushels and the Marrowfat for the same period an average of 24.5 bushels per acre.

In the spring of 1915, a bulletin on "Field Beans" was published by the College and copies can be obtained from the Department of Agriculture, Parliament Buildings, Toronto. In this bulletin the results are given of each of ten varieties of field beans for a period of ten years which show that the Pearce's Improved Tree bean stands at the head of the list with 23.4 bushels per acre, being 5.3 bushels per acre per annum higher than the yield of any other variety. The Pearce's Improved Tree bean is a medium sized white bean of excellent quality and requires a fairly long season to ripen.

Soy Beans.—Only two good reports of experiments with Soy beans were received from the experimenters in the past year. The Brown variety gave exactly one bushel per acre more than the O.A.C. No. 81. This was the first year in

which the O.A.C. No. 81 was distributed for co-operative experiments. It has surpassed the Brown Soy bean in yield per acre at the College but is a little later in reaching maturity.

Winter Emmer and Winter Barley.—In the co-operative experiments over Ontario in the past year, Black winter emmer surpassed winter barley in yield of grain per acre by 360 pounds. The winter emmer at the College has given an average of about 2,500 pounds of grain per acre in the results of the past nine years. Winter barley usually gives a large yield per acre when it survives the winter but it is somewhat more tender than winter wheat.

Corn for Grain Production.—Corn is one of the most difficult crops with which to experiment throughout Ontario. The variety which will give the best results on one part of a farm may not be the variety which will give the best satisfaction on another part of the same farm providing the soil is different on the two parts of the farm. Experiments, however, are of special value to the farmers and to the neighborhoods in which they are conducted even though the average results need to be considered with caution. In the spring of 1916, seed of seven varieties of corn was distributed for grain production. The varieties used in the co-operative tests were: Longfellow, Compton's Early, Salzers' North Dakota, Golden Glow, Bailey, White Cap Yellow Dent and Wisconsin No. 7. A number of reports have been received but the average would prove of but little service if placed amongst the other tabulated results. The season was exceedingly unfavorable for satisfactory results of co-operative experiments with varieties of corn for the past year.

Grains Grown in Combination for Grain Production.

For a number of years in succession systematic experimental work has been conducted at the Ontario Agricultural College in testing out various combinations of grain for green fodder, for hay and for grain production. The results of this work have been presented from time to time in the Annual Reports of the College. The combination of varieties of the same class of grain gave no appreciable advantage in increase in yield per acre. It was found that certain combinations of different classes of grain gave practically no advantage, while others furnished considerable increase in crop production. One of the most marked results obtained was from the combination of oats and barley grown in the proper proportions of the right varieties which gave a yield of fully two hundred pounds of grain per acre over either grain grown separately in the very carefully conducted tests which extended over a series of years.

Resulting from the experiments conducted with most grains at the College, tests were arranged for co-operative work throughout Ontario. An experiment was conducted for five years, finishing in 1909, in which different varieties of oats, barley and spring wheat were grown in combinations of two and three kinds of grain together. The average results of the five years' experiment showed that throughout Ontario one bushel of the Daubeney oats and one bushel of the Mandscheuri barley gave a higher yield of grain per acre than any of the other mixtures used in this experiment. In 1910 a co-operative experiment was conducted for the first time throughout Ontario in testing three different proportions of oats and barley in order to find out which one would give the highest yields on the average and on the different soils throughout the Province. In 1910 the varieties used were the Daubeney oats and the Mandscheuri barley; in 1911, the

Alaska oats and the O.A.C. No. 21 barley; in 1912, in 1913 and in 1914, the Daubeney oats and the O.A.C. No. 21 barley; in 1915 and in 1916, the O.A.C. No. 3 oats and the O.A.C. No. 21 barley.

The experiment has now been conducted for seven years, but in 1912 the reports were not of sufficient value to be tabulated. The average results of the experiment for each of the six years during which time this experiment has been satisfactorily conducted are as follows:—

Varieties and Combinations.	Seed per Acre.	Yield per Acre.													
		Tons of Straw.							Pounds of Grain.						
	Pounds.	1910	1911	1913	1914	1915	1916	Ave.	1910	1911	1913	1914	1915	1916	Ave.
Oats	17	1.32	.75	.97	.68	1.28	.77	.96	1,528	1,420	1,260	1,136	1,880	900	1,354
Barley.....	24														
Oats	34	1.47	.93	1.25	.68	1.72	1.08	1.19	2,104	1,820	1,510	1,296	2,270	1,320	1,720
Barley.....	48														
Oats	51	1.61	1.29	1.63	.65	1.86	1.26	1.38	2,096	1,594	1,700	1,488	1,980	1,320	1,696
Barley.....	72														

The average results show that a mixture by weight of one bushel of oats and one bushel of barley or a total of two bushels per acre has given the highest average yield in grain production in the six-year period. In production of straw, however, the heavier seeding produced the largest yield in nearly every year. In 1913 and in 1914 the heaviest seeding produced the largest yield of grain. These were comparatively dry seasons. In each of the six years the lightest seeding gave the lowest yield of grain per acre. In the results of more extensive experiments carried on at the College, extending for a period of fully a dozen years, the combination of one bushel of oats and one bushel of barley by weight has produced the largest yield of grain per acre.

Field Roots, Fodder Crops, Grasses, Clovers and Alfalfa.

In 1916 co-operative experiments were conducted throughout Ontario with mangels, sugar beets for feeding purposes, swede turnips, fall turnips, field carrots, fodder corn, millet, grass peas, vetches, rape, kale, field cabbage, mixed grains, grasses, clovers and alfalfa. As usual the number of applications for some of these crops was not large and the reports, especially in a few instances, were very meagre. In the majority of tests, however, we received a sufficient number of good reports of successfully conducted experiments to enable us to present the results in tabulated form and these are valuable as a general guide regarding the different varieties grown throughout the Province. We have always found it difficult to get full and satisfactory reports of grasses, clovers and alfalfa in a manner suitable for presentation in tabulated form. These different crops are not ready for cutting at the same time and the weather conditions frequently make it very difficult, indeed, to secure uniform weights of either the green crops or the hay. Some of the crops produce one, some two, and some even three cuttings in the one season, hence the difficulty in presenting definite information. The abnormal weather conditions of 1916 made it particularly difficult to get full

reports of some of the experiments with fodder crops. The following table gives in tabulated form the average results of some of the experiments here referred to:—

Experiments.	Varieties.	Comparative Value.	Yield per acre (tons).
Mangels (6 tests).....	Sutton's Mammoth Long Red.....	100	23.28
	Yellow Leviathan (Ferry).....	100	22.40
	Ideal (Ontario Seed Company).....	80	21.16
Sugar Mangels (4 tests).	Bruce's Giant White Feeding.....	100	29.09
	Rennie's Tankard Cream.....	91	28.37
Swede Turnips (8 tests).	Steele, Briggs' Good Luck.....	100	34.23
	American Purple Top.....	89	31.64
	Garton's Model.....	83	31.24
Fall Turnips (2 tests)...	Sutton's Purple Top Mammoth	100	38.36
	Red Top White Globe.....	100	35.96
Carrots (4 tests).....	Bruce's Mammoth Intermediate Smooth White.....	100	16.09
	Rennie's Mammoth Short White	93	15.61
Grass Peas and Vetches (2 tests).....	Hairy Vetches.....	100	14.64
	Common Vetches.....	50	6.20
	Grass Peas.....	50	4.41
Hairy Vetches and Winter Rye (3 tests).....	Common Winter Rye.....	100	7.64
	Hairy Vetches.....	93	5.84
Rape, Kale and Cabbage (2 tests).....	Sutton's Earliest Drumhead Cabbage.....	94	15.14
	Thousand Headed Kale.....	100	12.34
	Dwarf Essex Rape.....	96	12.22
Millet (2 tests).....	Japanese Panicle	91	10.88
	O. A. C. No. 74	100	9.68
	Hungarian Grass	88	8.48

Varieties of Mangels.—Mangels are classified according to shape into four distinct types, namely, long, intermediate, globe and tankard. Varieties of each of these classes have been tested over a series of years at the Ontario Agricultural College. The opinion formerly prevailed that the long red type of mangel was the most prolific in the production of roots. Within recent years, however, in the majority of experiments at the College and throughout Ontario the highest yields have been obtained from the intermediate and tankard types. The globe varieties have been usually somewhat lower in yield per acre.

In 1916 three varieties of mangels were distributed for co-operative experiments throughout Ontario. The long red type was represented by Sutton's Mammoth Long Red, the intermediate by the Yellow Leviathan, and the tankard by the Ideal. In the average of the co-operative tests the Sutton's Mammoth Long Red came first and the Ideal last in yield per acre for the past year. These three varieties have been included in the co-operative tests in each of the past six years. The average results for the six-year period, in which there were fifty distinct tests, show the following yields per acre per annum: Yellow Leviathan, 27.1 tons; Sutton's Mammoth Long Red, 26.7 tons; and Ideal, 26.6 tons. The seed of the Yellow Leviathan mangel was first obtained by the Ontario Agricultural College from D. M. Ferry & Co., Windsor, Ontario, in the spring of

1893. The name "Yellow Leviathan" was entered in the catalogues of some of our other Ontario seedsmen as follows: The Steele, Briggs Seed Co., Toronto, in 1896; James Hewer, Guelph, in 1908; The Wm. Rennie Seed Co., Toronto, J. A. Simmers, Toronto, and John A. Bruce, Hamilton, in 1909; and Geo. Keith, Toronto, in 1910. We have found that the seed under the name of Yellow Leviathan obtained from different seedsmen in Ontario has varied considerably in germinating power of the seed, and in shape, size and color of the roots in 1916 as well as in other years. As time advances, however, a larger proportion of the seed offered for sale appears to be truer to variety. According to reports from experimenters the Yellow Leviathan and the Yellow Intermediate mangels are grown more extensively than any other variety in the counties from which information was obtained.

Sugar Beets for Feeding Purposes.—This class of beets is frequently called sugar mangels and is distinct from the sugar beets grown for sugar production. The former contains on the average about eight or ten per cent. of sugar and the latter usually furnishes from fifteen to sixteen per cent. of sugar. For feeding purposes the sugar mangel is generally better to grow as it produces a larger yield per acre and is much more easily harvested.

A large number of varieties of sugar mangels have been grown at the Ontario Agricultural College and from these, two varieties have been selected for co-operative experiments, the same two varieties having been used in each of nine years. The average results of the co-operative experiments show that in yield of roots per acre the Bruce's Giant White Feeding gave 29.1 tons in 1916 and an average of 26.2 tons for nine years and that the Rennie's Tankard Cream gave 28.4 tons in 1916 and an average of 25.4 tons in the nine years.

Swede Turnips.—In each of the past two years the same three varieties of swede turnips were used for the co-operative experiments. The following gives the yields per acre for 1916 and for the average of the two years: Steele, Briggs' Good Luck, 34.2 and 30.6; American Purple Top, 31.6 and 29.2; and Garton's Model, 31.2 and 28.5. The comparative yields came in the same order in each of the past two years.

Fall Turnips.—There is but little interest taken in fall turnips in Ontario. As a result of the two co-operative experiments conducted in 1916, the Sutton's Purple Top Mammoth gave the highest and the Red Top White Globe the lowest yield per acre. In the past year the returns were somewhat higher than usual for this class of turnips.

Field Carrots.—At one time the White Belgian carrot was grown quite extensively as a field crop in Ontario. Our experiments, however, showed this variety to be a light yielder and one which was very difficult to harvest. Within the past few years the Intermediate White field carrots have been used almost exclusively. Several of the seedsmen sell seed of this type which produce carrots which are very similar in characteristics. The Bruce's Mammoth Intermediate Smooth White carrot surpassed Rennie's Mammoth Short White in the co-operative tests of the past year by an average of about one-half ton of roots per acre.

Fodder Corn.—In recent years fodder or silage corn has been gradually increasing in acreage. It is probably correct to say that fodder corn is likely to increase from year to year as it furnishes such a large amount of valuable stock feed and is pre-eminently the silage crop of Ontario. The thorough cultivation of corn not only furnishes a good crop but cleans the land and leaves it in splendid condition for the crops which are to follow. Corn is therefore one of

the important cultivated crops for the rotations which can be successfully carried out in Ontario.

Owing to the very abnormal weather conditions of the past year it is considered unwise to present the results of experiments with corn, in which three flint and four dent varieties were used in competition.

Grass Peas and Vetches.—For eighteen years in succession experiments have been conducted throughout Ontario in the testing of grass peas, hairy vetches and common vetches. This has enabled the farmers to glean valuable information regarding these three leguminous crops, about which a considerable amount has been written in recent years. The hairy vetches in particular have received much attention. The grass peas have been grown in Ontario as a farm crop, the common vetches for mixing with oats as a green fodder, and the hairy vetches for fodder, but more particularly as a cover crop for orchards.

In 1916, the hairy vetches gave an average yield of 14.6 tons of green crop per acre, which was exceptionally high. The following gives the average yields in green crop per acre of each of these crops for 1916 and for the average of sixteen years, in which there were fifty-two separate tests: Hairy vetches, 14.6 and 8.5; Grass peas, 4.4 and 6.9; and Common vetches, 6.2 and 6.3.

Rape, Kale and Field Cabbage.—Some fairly satisfactory reports were obtained with each of the three crops included in this experiment in each of four years. The following gives the yields of green crop per acre of each of the varieties included in this experiment for 1916 and for the average of four years: Sutton's Earliest Drumhead Cabbage, 15.1 and 17.4; Thousand Headed Kale, 12.3 and 13.9; Dwarf Essex Rape, 12.2 and 13.1. The Sutton's Earliest Drumhead Cabbage when sown at the rate of one and one-half pounds per acre and left unthinned the same as rape gives a large amount of feed which is valuable in the same way as rape for pasturing in the autumn.

Millet.—The same three varieties of millet have been tested in each of the past three years but there were no satisfactory returns secured in 1915. The average yields in tons of green crop of millet per acre of the different varieties for 1916 and for the average of the two years are as follows: Japanese Panicle, 10.9 and 9.8; O.A.C. No. 71, 9.7 and 8.5; and Hungarian Grass, 8.5 and 7.3.

Hairy Vetches and Winter Rye.—Hairy vetches are sown either in the winter or in the spring. Our experiments have shown that the best results are obtained from the hairy vetches when sown in the autumn. The two varieties of crops included in this test were distributed in the autumn of 1915 for co-operative experiments but no satisfactory returns have been received this year.

Sorghum.—Sorghum is classified into sweet sorghum sometimes called sugar cane and non-saccharine sorghum, the latter including the broom corns, kaffir corns, milo maize, Jerusalem corn, etc. Only the sweet sorghum has been used for our co-operative experiments, the Early Minnesota and the Early Amber varieties being the two particular varieties used. These have given very good results in some localities in Ontario and the Early Amber is now grown for fodder purposes and for the production of seed with a considerable amount of satisfaction. The Early Amber variety is also used in an annual pasture mixture as follows: thirty pounds of sugar cane, fifty-one pounds of oats and seven pounds of red clover seed per acre. If this mixture is sown in the first week in May it is usually ready for pasturing about the twentieth of June and forms a natural rotation of pasture throughout the season, and the clover is usually in a good condition to come through the winter and to produce one or two crops in the following year.

Grasses, Clovers and Alfalfa.—A large amount of interesting and valuable work is being conducted with grasses, clovers and alfalfa both at the College and throughout Ontario. As has already been mentioned in the introductory paragraph under the last heading, it is exceedingly difficult to present definite yields of the different varieties represented by these three classes of farm crops. Besides the regular co-operative work with alfalfa in testing out the two hardiest strains, namely, the Ontario Variegated and the Grimm, a number of experiments are being conducted by the District Representatives. One was to show the influence of lime and of inoculation, another to show the influence of sowing broadcast and in rows by the use of different amounts of seed per acre and still another to test the relative value for seed production of the first and the second crop in the season.

Varieties of Sweet Corn for Table Use.

From two to three varieties of sweet corn have been used for co-operative experiments in each of several years. The production of sweet corn in Ontario is much more general now than it was at an earlier date owing to the fact that it is used more abundantly for home use and is also grown extensively in some sections for canning purposes. Sweet corn is also used to a limited extent as a green or as a dry fodder for farm stock. For home use it is important to secure those varieties which are ready for use at different dates and which produce corn of the highest quality for table use. For factory purposes it is important to have good sized ears of white corn of good flavor. For the production of fodder it is important to grow varieties which produce a large amount of stalks and ears which are most suitable for feeding in the autumn to farm stock, especially to supplement the pastures in a dry time. The main object in the co-operative experiments with sweet corn has been to secure the variety for table use at home that will furnish grain which is sweet, juicy and tender, and ears which are comparatively small and have eight rows.

At the Ontario Agricultural College upwards of fifty varieties of sweet corn have been tested under uniform conditions. This has given a good opportunity for studying the different varieties in the field and of comparing the quality of the grain for table use. In the co-operative experiments the varieties which have been used most extensively have been the Golden Bantam, the Mammoth White Cory, and the Malakhoff. Of these varieties the Golden Bantam proved the best, the Mammoth White Cory the second best and the Malakhoff came lowest in the list. In each of the past four years only two varieties have been selected for distribution, one being the kind which has proven most desirable as an early corn and the other being a standard late variety. The two kinds used were the Golden Bantam of the early and the Stowell's Evergreen of the late varieties. The following table gives the average results of twelve successfully conducted tests of these two varieties under similar conditions in 1916:—

Experiment.	Varieties.	Comparative Value.	Number of Ears.	Number of days until ready for table use.	Table quality.	
					Flavor.	Juiciness.
Sweet Corn (12 tests) ..	Golden Bantam .	100	135	87	100	100
	Stowell's Evergreen	69	112	100	83	96

The Golden Bantam and the Stowell's Evergreen varieties of Sweet corn have been distributed for co-operative experiments in each of the past four years. In each of these years the Golden Bantam was the most popular with the experimenters, the comparative value being represented by one hundred (100), while that of the Stowell's Evergreen was represented by sixty-nine (69) in 1916, seventy-seven (77) in 1915, eighty-three (83) in 1914 and seventy-three (73) in 1913. In comparative number of ears the Golden Bantam was the highest throughout. The Golden Bantam was ready for use earlier than the Stowell's Evergreen by thirteen days in 1916, ten days in 1915, thirteen days in 1914 and fifteen days in 1913. In both flavor and juiciness the Golden Bantam surpassed the Evergreen in each year of the co-operative tests. The Golden Bantam variety of Sweet Corn has certainly made a high record for table use throughout Ontario and is increasing rapidly on many of the farms throughout the Province.

Varieties of Potatoes.

Within the past year a bulletin was issued from the Field Husbandry Department at the College on potatoes, copies of which may be obtained from the Department of Agriculture, Toronto, Ontario. This bulletin gives the results of upwards of forty distinct experiments conducted at the College, nearly all of which extended over a period of five years or more. In each of the past two years potatoes have been imported from the Eastern Provinces and from the Provinces and States in the far west in order to supply Ontario's requirements. In normal seasons Ontario should certainly produce enough potatoes to at least satisfy home consumption. Most of the soils of Ontario are very well adapted to potato production, providing they are properly underdrained, either naturally or artificially. Some sections of the Province are particularly well suited to potato growing on a large commercial basis.

In each of the five years an experiment has been conducted at the College in testing, under uniform conditions, potatoes obtained from different sources. For instance, eighteen lots of Empire State potatoes were secured from eight different sources, five being from the Province of New Brunswick and three from Ontario. Seed potatoes grown about one hundred and forty miles north of Guelph in the Muskoka District, near the Muskoka Lakes, have given a higher yield per acre than any of those from any other source in each of the five years of these experiments.

According to results of experiments which we have conducted, immature potatoes have a special value for seed purposes. These results probably explain how it is that the potatoes produced in a northern district usually give such excellent results when grown farther south, in comparison with the seed produced in a longer season with more intense heat.

To place potato production on a more substantial basis in Ontario it would be wise to develop seed production in the northern part of the Province; to form potato growers' co-operative associations based on sound and up-to-date business principles and upon the loyalty and the co-operative spirit of the members; to grow only a few of the best varieties, such as Empire State, Davies' Warrior and possibly Dooley of the late varieties and Extra Early Eureka or Irish Cobbler of the earlier kinds.

In 1916 an inquiry was made from our hundreds of experimenters with potatoes, regarding the most extensively grown varieties in the separate counties

of Ontario. In all fifty-seven varieties were mentioned one or more times as being the most extensively grown in the different counties. As the result of a similar inquiry thirty-nine varieties were mentioned in 1915, fifty-one in 1914, fifty-seven in 1913, and fifty-eight in 1912. It is to be hoped that within a short time the potato growers will confine themselves largely to a few of the highest yielding varieties of the best quality. The following gives the names and the order of the varieties which were mentioned the greatest number of times in 1916: Irish Cobbler, 58; Delaware, 47; Rural New Yorker, 31; Carman and Green Mountain, each 24; Empire State, 16; Extra Early Eureka, 15; Early Rose, 13; Beauty of Hebron, 12; White Elephant and Dooley, each 9; Carman No. 1 and Gold Coin, each 5; American Wonder, 4; and Early Ohio, 3. Each of five other varieties were mentioned twice and each of the others only once. In the average of the three years previous to 1916 the varieties mentioned the greatest number of times on the average were as follows: Rural New Yorker No. 2, 26; Irish Cobbler and Delaware, each 22; Carman, 20; Green Mountain, 13; Empire State and Early Rose, each 12; Carman No. 1, 9; Extra Early Eureka and American Wonder, each 8; White Elephant, 7; Early Ohio and Dooley, each 6; and Beauty of Hebron, 5. It looks as if the use of the Irish Cobbler is increasing rapidly and that of the Rural New Yorker is gradually decreasing. As some reports mention Carman No. 1 and others No. 3 and still others just Carman, it is difficult to classify these varieties.

In the co-operative experiments conducted previous to 1913 it was found that the Davies' Warrior had made the highest record of the late potatoes and the Extra Early Eureka of the early varieties. It might be mentioned that the Extra Early Eureka and the Irish Cobbler are both early potatoes which resemble each other closely but in the experiments, extending over a series of years at the College, the Extra Early Eureka has somewhat surpassed the Irish Cobbler in both yield and quality. It was decided in the spring of 1913 to use only Davies' Warrior and Extra Early Eureka for the co-operative tests. The same two varieties have now been used in each of the past four years. The following table gives the average results of the co-operative experiments with two varieties of potatoes successfully tested on one hundred and four farms in 1916:

Classes.	Varieties.	Comparative Value.	Per cent. of Small Tubers.	Mealiness when Cooked.	Bushels of Whole Crop per Acre.
Potatoes 104 tests..	Davies' Warrior.	99	22	89	101.15
	Extra Early Eureka.....	100	18	100	89.97

For ten years in succession the Davies' Warrior variety of potatoes has been included along with a large number of other varieties in the experiments at the Ontario Agricultural College, and it has given the largest yield per acre in the average for the whole period. It is a late variety and some people object to a particularly late potato. The Extra Early Eureka being an early variety is more popular with some growers, especially if they are anxious to secure early potatoes either for home use or for market.

In the co-operative experiments for 1915 the Davies' Warrior gave an average of 101.2 bushels per acre and the Extra Early Eureka of 90 bushels per acre.

These average results are comparatively low and yet we find by information obtained through the Ontario Bureau of Industries Report that the average yield of potatoes throughout Ontario for 1916 was only 53 bushels per acre, which is decidedly the lowest yield for Ontario within the past thirty-five years. The Davies' Warrior and the Extra Early Eureka varieties have been used in the co-operative experiments in each of the past six years and the average yield per acre for the six-year period, in which there were one thousand four hundred and seven successfully conducted tests, was 139.8 bushels for the former and 120 bushels for the latter. Both of these varieties are of good table quality according to both the College experiments and the co-operative tests. Of all the varieties which have been grown at the College the Davies' Warrior and the Extra Early Eureka are amongst the freest from rot as will be seen by reference to Bulletin No. 239 referred to in the earlier part of this report. In the co-operative experiments the Extra Early Eureka was slightly more popular with the experimenters than the Davies' Warrior in each of the past three years, owing, no doubt, to its reaching maturity at an earlier date. In each of the past two years the Davies' Warrior has dropped somewhat in table quality owing to the fact that it has not been thoroughly matured because of the abnormal seasons. Both varieties produce white potatoes of good form which are readily purchased on the markets.

Fertilizers and Manures with Farm Crops.

Within the past twenty-five years a large amount of co-operative experimental work has been conducted throughout Ontario, in comparing stable manure and different kinds of commercial fertilizers with a number of farm crops.

At first, the experiments were made as simple as possible so that the people conducting them could furnish complete reports. As experience has been obtained the work has gradually become more complicated and is improving in value from year to year. A number of experimenters conducting work in connection with the Experimental Union have been carrying on tests successfully for a number of years, and are now in a position to conduct fertilizer work with a large amount of satisfaction.

In 1916, co-operative experiments were conducted with the application of manures and fertilizers on potatoes, winter wheat, mangels and rape. Owing to the abnormal weather conditions we have not received satisfactory reports of the experiments with winter wheat, mangels or rape. As there were eighty farmers conducting the experiment with fertilizers and potatoes, we have a sufficient number of good reports for presentation at this time.

Manures and Fertilizers with Potatoes.

As the result of an experiment conducted at the Ontario Agricultural College in each of five years, it was found that the Potato Fertilizer and the Royal Canadian Fertilizer gave the highest yield of potatoes per acre of the different fertilizers used in the five-year experiment. In another experiment, also extending over a period of five years, in which several fertilizers were used, the highest yield per acre was obtained from a mixed fertilizer similar to the one used in our co-operative experiments, and which was composed of nitrate of soda, muriate of potash and superphosphate in the proportion by weight of one, one and two, and which was applied at the rate of 213 pounds per acre. This was followed by the Potato Fertilizer and the Royal Canadian Fertilizer, each of which was applied at the rate of 320 pounds

per acre. In consideration of these and other results, a co-operative experiment was conducted in each of five years previous to 1912, in which six fertilizers were compared with each other, with farmyard manure, and with no fertilizer with potatoes.

Based on the results of these past experiments, it was thought wise to start a co-operative experiment in testing different quantities of fertilizers per acre, in comparison with each other, with farmyard manure alone, with farmyard manure and fertilizer, and with unfertilized land. We, therefore, placed on our list, in the spring of 1912, an experiment with fertilizers, cow manure, and no fertilizer with potatoes, and in each year since, this experiment has been conducted in 120 places throughout the Province, except in 1915, and again in 1916, when the test was conducted on 80 farms. In each of five years we divided the fertilizer experiment with potatoes into four groups of equal numbers, and used the potato fertilizer for group "A," the Royal Canadian Fertilizer for group "B," a fertilizer composed of nitrate of soda, muriate of potash and superphosphate in the proportion by weight of seven, nine and sixteen for group "C," and a fertilizer composed of nitrate of soda, muriate of potash and superphosphate in the proportion of one, one and two for group "D." Each of the first three fertilizers was applied alone at the rate of 320, 640 and 960 pounds per acre, and 320 pounds in combination, with ten tons of cow manure per acre. For group "D" the fertilizer was used alone at the rates of 213, 426 and 639 pounds per acre, and 213 pounds in combination with ten tons of cow manure per acre. In comparison with each of these, another experiment received cow manure at the rate of twenty tons per acre, and one plot was left unfertilized.

The following were the instructions to the experimenters for the test with commercial fertilizers, cow manure and no fertilizer with potatoes which has been conducted in each of the past five years.

1. Be sure and do not leave out any fertilizer belonging to the experiment.
2. Secure five hundred pounds of average cow manure, for one plot, and two hundred and fifty pounds of average cow manure for another plot, the latter to be used in addition to commercial fertilizer as explained below.
3. Wooden stakes painted white, on which the names of the fertilizers are plainly written with a lead pencil, answer nicely for labels.
4. Wooden stakes, two inches square and two feet long, with the lower ends sharpened, are very suitable for driving in the ground at the four corners of each plot.
5. For your experiment be sure to select soil which is very uniform throughout, and which is about the average quality of your farm.
6. Locate the experiment some distance away from buildings and trees, in order to prevent any injury by poultry or birds, or by the shade or the roots of trees, etc. Try and have your experiment near the public road where it can be seen by the people who pass by.
7. Cultivate and harrow the land thoroughly, allowing for a path three feet wide between each two plots.
8. Carefully measure six uniform plots; each plot being exactly two rods (33 feet) long by exactly one rod (sixteen and one-half feet) wide.
9. Drive the wooden stakes at the four corners of each plot, and leave a clean path three feet wide between each two plots.
10. Leave plot one without any fertilizer or manure as a basis for comparison. Sow the complete fertilizer from one of the small bags on plot two, that from the other small bag on plot five, that from the medium-sized bag on plot three, and that from the large bag on plot four. Spread 250 pounds of average cow manure on plot five and 500 pounds of average cow manure on plot six. It will be seen that plot five will have both commercial fertilizer and cow manure. After the commercial fertilizer and cow manure have all been applied thoroughly stir the surface of the land to a depth of three or four inches on each of the six plots.
11. Mark out each plot into six rows, having each row thirty-three feet long, and allowing thirty-three inches between the rows.
12. Count the potatoes in each package and cut each lot into one hundred and thirty-two pieces.
13. Plant all packages of potatoes on the same day, immediately after cutting. Start to plant nine inches from the end of each row, and drop the pieces eighteen inches

apart. There will thus be room for exactly one hundred and thirty-two pieces on each plot.

14. Carefully treat all the potatoes for the potato beetle or "bug."

15. Count the number of hills of potatoes which grow on each plot.

16. When ripe, dig the potatoes and carefully count and weigh those on each plot separately.

17. Examine your report carefully and see that all the facts of the experiment are entered correctly.

18. Make a copy of the report and keep it yourself for future reference.

19. Kindly forward the report to C. A. Zavitz, Agricultural College, Guelph, Ont., as soon as possible after harvest.

The following table gives the average results of the various tests of each of the four fertilizers, and also the average results for the four fertilizers comprising in all ninety-five separate tests conducted during the five years:

Fertilizers and Manures.	Fertilizer per acre.		Yield of Potatoes per acre (bushels.)				
	Weight Pounds.	Cost $ c.	A. Potato Fertilizer 5 years (24 tests).	B. Royal Canadian Fertilizer 5 years (24 tests).	C. Home Mixture 5 years (24 tests).	D. *Home Mixture 5 years (23 tests).	A. B. C. D. Ave. Four Fertilizers 5 years (95 tests).
1. No Fertilizer.....	.....	.....	138.9	112.6	99.2	139.1	122.4
2. Fertilizer.....	320	6 31	152.0	131.1	123.6	158.5	141.3
3. Fertilizer	640	12 62	158.8	142.0	135.4	170.3	151.6
4. Fertilizer	960	18 93	163.4	156.6	149.0	178.6	161.9
5. {Fertilizer..... / Cow manure	320 / 10 tons	9 31	169.4	155.7	149.8	182.9	164.5
6. Cow manure	20 tons	6 00	176.1	155.3	150.2	184.8	166.6

The following statement gives the composition of the different fertilizers used in the experiments as determined by the Chemical Department of the College.

A. Potato fertilizer, 3.19 per cent. nitrogen; 9.25 per cent. available phosphoric acid, and 6.30 per cent. potash.

B. Royal Canadian, 3.83 per cent. nitrogen; 10.15 per cent. available phosphoric acid, and 5.38 per cent. potash.

C. { Nitrate of soda, 15.7 per cent. nitrogen.
& { Muriate of potash, 50.9 per cent. potash.

D. Superphosphate, 15.4 per cent. available phosphoric acid.

The cost of each fertilizer as given in the table represents approximately, under normal conditions, the average cost per acre for the fertilizers as used in the co-operative experiments. The quotations were based on the factory prices for quantities per ton of each one of the fertilizers. The twenty tons of cow manure would mean about twelve good-sized loads per acre, and manure in Guelph has been selling at about fifty cents per load, which is probably about the average for the Province. It is exceedingly difficult to place a price on farmyard manure, as in most cases it is not purchased, but is produced on the farm. Each person may place such value on the manure as he deems expedient, and study the results according to his own circum-

*Home mixture "D" was used at the rates of 213, 426 and 639, and at the comparative cost of $4.24, $8.48 and $12.72 per acre.

stances. It should be stated that the freight on the fertilizers and the application of both the fertilizers and the manure are not taken into consideration in the foregoing statement, nor yet is there any account made of the influence of the different fertilizers and the manure upon the land after the first season, except in the later experiments.

It should be understood that the different fertilizers were tested on different farms. It is, therefore, not fair to make a close comparison of one fertilizer with another. The results are valuable in showing the yields from the different amounts of fertilizer in comparison with the yield from no fertilizer, from cow manure alone, and from the combination of cow manure and fertilizer.

The average results presented are for the total number of tests for each fertilizer without respect to the year in which they were conducted. In fact, in 1916, there were no successfully conducted experiments with fertilizer "C," nor were there any in 1915 with fertilizer "D."

It will be seen that the increase in the yield of potatoes was not in exact proportion with the increase in fertilizers. On the average there was an increase in yield of potatoes per acre of 18.9 bushels at a cost of 33.4 cents per bushel from 320 pounds of fertilizer; of 29.2 bushels at a cost of 43.2 cents per bushel from 640 pounds of fertilizer; and of 39.5 bushels at a cost of 47.9 cents per bushel from 960 pounds of fertilizer. From a study of these results it would seem as though the 18.9 bushels was the increase from the first 320 pounds of fertilizer; 10.3 bushels from the second 320 pounds, and 10.3 bushels per acre for the third 320 pounds. It will also be observed that the twenty tons of cow manure per acre increased the yield of potatoes 44.2 bushels or 2.1 bushels per acre more than the combination of ten tons of cow manure and 320 pounds of fertilizer per acre. The amount of fertilizer in group "D" was less, therefore, than the amount of each of the other groups as has already been explained. It was identical in composition with the home mixed fertilizer used for five years at the rate of 213 pounds per acre with potatoes throughout Ontario, in experiments conducted on ninety-eight farms, the results of which have been presented in former reports. It will be observed that the 213 pounds per acre of fertilizer "D" increased the yield per acre by 19.4 bushels at an average cost of 21.9 cents per bushels.

Each experimenter was asked to conduct his fertilizer test on the average soil of his farm. The results here presented are therefore, for the average soils of Ontario. On some farms the fertilizers paid much better than they did on others. Every farmer who wishes to use fertilizers should become familiar with the requirements of his own particular farm. Such experiments as these here referred to aid the farmers materially in gleaning useful information regarding the value of fertilizers upon their own particular soils. The summary results show in a general way, the value of the use of these fertilizers in varying quantities and under different conditions on the farm lands of Ontario and should furnish valuable suggestions.

Efforts have been made in the past three years to have the experimenters with fertilizers and potatoes continue the tests with grain plots to ascertain the after effects of the fertilizers and the manure. We are not in a position as yet to report the continuous effects of the fertilizers as determined by the co-operative experimenters.

In the spring of 1914, each of the four groups of fertilizers were used with the potato crop at the College, according to the same regulations as the tests were conducted throughout the Province. The plots were sown with barley in

1915, and with oats in 1916, without the application of either fertilizers or manure. The oats were seeded with clover, and in 1917 we hope to secure results showing the influence of fertilizers and manure with the clover crop, which is the fourth year after the application of fertilizers and manure with potatoes.

The following table gives the yields of potatoes in 1914, of barley straw and grain in 1915, and of oat straw and grain in 1916, being the average in each case of the four groups of fertilizers:

Fertilizers and Manures.	Fertilizer per Acre.		1914 Potatoes.	1915 Barley.		1916 Oats.	
	Weight.	Cost.	Yield per Acre.	Yield per Acre.		Yield per Acre.	
				Straw.	Grain.	Straw.	Grain.
	Pounds	$ c.	bush.	tons	bush.	tons	bush.
1. No Fertilizer .	.....	.....	79.4	1.01	36.2	1.00	33.0
2. Fertilizer	320	6 31	106.7	1.15	41.7	1.11	35.3
3. Fertilizer	640	12 62	115.4	1.16	42.7	1.13	35.9
4. Fertilizer	960	18 93	118.8	1.25	47.5	1.12	36.1
5. {Fertilizer . . {Cow Manure.	320 10 tons	9 31	175.7	1.48	55.2	1.30	37.1
6. Cow Manure..	20 tons	6 00	182.8	1.70	59.8	1.39	41.8

It should be understood that in group "D," the amounts of fertilizers were less than in groups "A," "B" and "C," as explained in connection with the co-operative tests. The soil on which the experiment was conducted might be termed a clay loam. It is quite level and appears to be comparatively uniform throughout. It will be seen that each of the fertilizers and manure exerts the same influence with the oat crop in the third year after each application was made. Farmyard manure showed decidedly the greatest influence on the potato crop in 1914, and on both straw and grain in each of the past two years. We expect to continue these experiments on the same land for a long period of time.

A MEMBER: What would be the weight of your barley and oats, sown as you mention?

DR. ZAVITZ: We use a standard mixture of 34 pounds of oats and 48 pounds of barley, making a total of 82 pounds of the mixture sown per acre.

A MEMBER: Would O.A.C. No. 21 barley and O.A.C. No. 72 oats do well?

DR. ZAVITZ: No, they would not make a good mixture as the oats would ripen about ten days later than the barley. O.A.C. No. 21 barley and O.A.C. No. 3 oats make the best mixture I know of, because they not only ripen about the same time, but you get quality and quantity as well.

A MEMBER: Do you think cabbage makes a better pasture plant than rape?

DR. ZAVITZ: It would be fully as good.

A MEMBER: It is a great deal better in my opinion, at least with the kinds I have tried. I have not had experience with a very large number of varieties. Years ago cabbage was brought to my attention by a man passing along while I was gardening. He said, "Why don't you try a few heads of cabbage in that piece of land you have vacant." I followed his advice and had two hundred head. I do not think there is anything else that will give the same return as a field of Cow cabbage. I feel quite satisfied that if any man who will embark on the undertaking of putting in a field of Cow cabbage he will more than treble

the amount of food he is at present getting off any given area of his land. I was asked once by a man who was anxious to try cabbage "What induced you to plant this crop?" I told him, and on my suggestion he planted seven thousand head in one of the fields of his farm. His results were so successful that from that time on he never planted less than from twenty to twenty-five acres, and never had a crop of less than 6,500 cabbages to the acre. On the farm where I worked the owner was a breeder of champion South Down sheep, and was always glad to experiment if he thought it would give good results. We were feeding rape cake to the animals that were going on exhibition, but when we began feeding this Cow cabbage, both early and late varieties, we no longer required the same amount of cake. After commencing to grow cabbage I never knew that farm to be short of feed.

DR. ZAVITZ: That is splendid information. We want more experimenters of that kind.

A MEMBER: In feeding it to dairy cows did you find it to injure the milk in any way?

A MEMBER: No, but we never fed it to milk cows except just after milking.

A MEMBER: What potatoes were mentioned in your paper?

DR. ZAVITZ: The Davies' Warrior, a late variety, and the Extra Early Eureka, an early variety.

A MEMBER: How is the Ligowa oat?

DR. ZAVITZ: The Ligowa oat has done very well in Montana and generally in the Western States. It gives a good length of straw and a good yield, but matures somewhat late. We have had it for fifteen years, securing it first from Dr. Saunders, at Ottawa. Since then we have obtained fresh seed from other sources. It is a good oat.

A MEMBER: What about the White Wave variety?

DR. ZAVITZ: It has just given fair results in our experiments.

A MEMBER: How does the Swedish Select oat compare with other varieties in Ontario?

DR. ZAVITZ: It does not do as well here as in the North-western States. In Wisconsin it has done very well. We tried it some years ago and found it did not fulfil the expectations we had of it from the reports of others growing it in the North-western States. The trouble is we have about fifty to seventy fairly good varieties of oats, of which this is one. What is wanted is an outstanding oat.

A MEMBER: In Wyoming I have seen the Swedish Select outyield any other variety.

DR. ZAVITZ: I know it has given excellent results in the north-west. A variety may do very well in one locality but not in another.

A MEMBER: How about oats and emmer, and oats and barley? Which do you think is the better combination?

DR. ZAVITZ: Emmer and oats do not make a good combination. The oats do not stand up well with the emmer as the latter is weak in the straw.

A MEMBER: How about oats and spring wheat?

DR. ZAVITZ: We have not obtained as large a yield from oats and spring wheat sown together as from barley and oats in combination. I might mention that in the north-western States, where there is a lack of moisture, they get a better crop of emmer than we do in Ontario. Emmer is a drought resisting plant.

A MEMBER: Will oats and barley make good hog feed when sown together?

DR. ZAVITZ: Yes, it makes good hog feed, being about the same as emmer

and barley. Emmer competed favorably with oats here in a dry season, but the last two or three seasons which have been wet has reduced the yield considerably. I doubt if it will ever become as prominent here as it is in the west.

PROF. MURRAY: We have tested the Registered Banner oat from the Maritime Provinces in our experimental plots at Macdonald College. About eight years ago there was a carload of Registered Banner oats brought in from the Maritime Provinces and sold in Quebec City. The quality of oats at that time, at the Provincial Fairs of Quebec was very poor, but last year there were some of the finest oats exhibited that I have ever seen, and at almost every exhibition these fine oats were the product of the first carload of Registered Banner oats which were sold eight years ago in Quebec City. Now, the Maritime Province oats are quite generally sown throughout Quebec Province.

DR. ZAVITZ: Will they compare favorably with the home grown seed?

PROF. MURRAY: Yes, the Maritime Provinces produce excellent oats; in fact, the quality of their oats is on the average better than that grown in Ontario and Quebec.

MR. WAUGH: Oats from the Maritime Provinces, providing you buy from a reliable man, will be pretty sure to give you good results.

DR. ZAVITZ: I have just returned from Nova Scotia, and in the Short Course there this point was emphasized: If you get Banner oats, such as War Sealed, which is the best strain, you will be pretty sure to get good results. If you write for these oats you could apply to the Department of Agriculture, Charlottetown, P.E.I., or to the President of the Agricultural College at Truro.

A MEMBER: The reason I asked this question is that a friend of mine purchased some oats from Prince Edward Island, Registered American Banner, and sowed them beside our own oats. They were the largest oats I ever saw, but the mistake was made in not sowing them thickly enough. I would suggest oats like that for heavy land such as we have in Northern and Western Ontario, but it would be necessary to increase the amount of seed over what is generally sown in Ontario.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN APICULTURE.

MORLEY PETTIT, PROVINCIAL APIARIST, O.A.C., GUELPH.

Beekeepers are annually confronted with problems peculiar to the individual year. What was their greatest difficulty last year may not cause trouble this, and small features of management which were overlooked in 1915 may have been very important in 1916. For these reasons the experiments to be of real value must be extended over a series of years, so as to gain cumulative evidence. With this in view practically every experiment is continued from year to year—and others added.

The season of 1916 was particularly favorable for the production of honey, because of a combination of circumstances, particularly the frequent rains. It will be remembered that the clover plant bears honey in the second year of its life. A super-abundance of moisture during the growing period of the first year, a favorable winter, much more moisture the second year right up to the blooming period, then heat and fine weather while honey is yielding—these are the conditions of clover honey production. Ontario experienced these conditions leading up to the

large crop of 1913 and again in 1916. It is to be hoped that 1917 will not be a failure like 1914 was. While continuous rains make travelling difficult and outside work disagreeable, the beekeeper should remember that it is often too dry and almost never too wet for a good crop of honey.

The past season was one of excessive swarming—one when most rules of swarm prevention failed. Only drastic measures would control. One yard under the writer's observation wintered well and several colonies had contracted swarming impulse by June 1st; this in spite of double brood chambers having been given previously. If the trend of the season had been properly foreseen these colonies should have been divided at that time. The effort to hold them together was continued with the expectation that the flow would begin in a few days. Rain continued till the 24th, then the first real warm day came on June 26th, when the scale hive gained 14 lbs. From that on the flow was continuous for one month, then it cut off almost as quickly as it had started.

Experimenters were hampered not only by an excessive tendency to swarm on the part of bees, but by a great scarcity of labor for general farm work, and plans for both bees and men were disorganized by the rainy weather which threw the June work over into the month of July, which is already over-crowded under normal conditions. The situation was made even worse by the fact that beekeepers became discouraged during the rainy weather and failed to order sufficient supplies to take care of the honey crop which came in abnormal quantities in July. The great quantity of combs which had to be built made the new experiments 11 and 12 especially popular, the former being a new style of tool for embedding the wires of frames in foundation, and the latter a method of wiring frames so that a full sheet of foundation is held securely without the trouble of fastening it to the top bar. In both cases we supplied the material for the experiment.

Eleven different experiments were offered and the materials for 475 separate tests were sent out. The average sized apiary represented was 31 colonies.

Swarm Control Group.

Experiment No. 1.—*Prevention of Natural Swarming in Extracted Honey Production by Holding the Colony Together.*

Full directions for this experiment were published in the Annual Report for 1910, page 49. It consists in keeping the bees comfortable by giving room for the queen to lay and for the storage of honey from week to week as needed and before the swarming impulse is developed.

Instructions were sent to 57 experimenters and 12 reports were received. One beekeeper reported that he was able to produce 25 lbs. per colony more than his usual method and to prevent all swarming. Another reported that he had no fear of swarming, as he is now "master of the situation."

In only one case was the experiment a failure, and the experimenter added that "the bees got ahead of me so I could not carry out the experiment."

Experiment No. 2.—*Prevention of Natural Swarming in Comb Honey Production by Artificial Shaken Swarming.*

This method is described in the Annual Report for 1911, page 51.

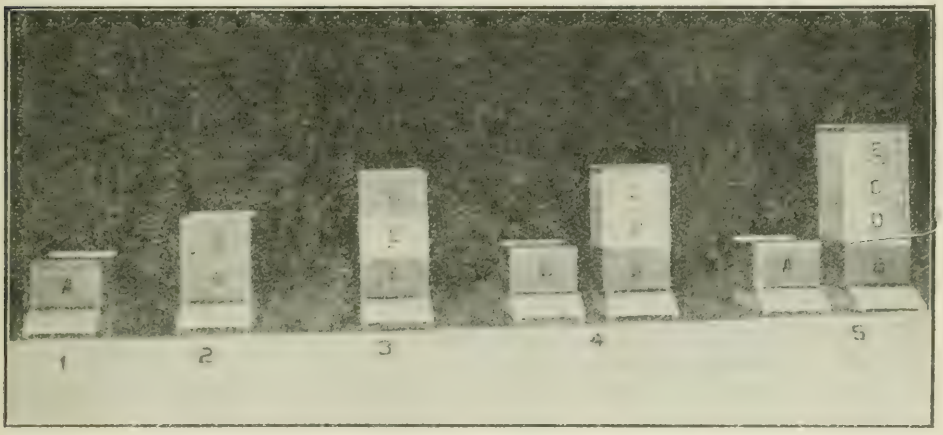
The bees are allowed to contract the swarming impulse and are then shaken on to starters in the brood chamber to encourage them to work in the supers.

Eleven beekeepers received instructions for this experiment and two reports were received, one stating that the experimenter had been using the same method previously and was, therefore, unable to make a comparison. The other reported that he had received enough pay for a lot of experience.

EXPERIMENT NO. 3.—*Prevention of Natural Swarming by Manipulation of Hives instead of Combs.*

Instructions for this experiment are as follows:

Whenever on the weekly examination a colony is found to be occupying all the spaces between combs right out to both outside walls of the brood chamber (A Fig. 1), it is given on top an extra brood chamber (B Fig. 2) with empty worker combs, preferably some which have had brood reared in them. In good colonies



Management of Lot A to prevent swarming.

this may occur in May, and the extra laying space for the queen puts a strong check on the swarming impulse, so that when treated in time they will not likely swarm for three or four weeks. The experimenter should continue the weekly examination, however, just for his own edification and satisfaction. Dark honey stored during fruit bloom or left over from last year should be uncapped, a little each week, to get the bees to use it up in brood rearing. Any surplus of this must be removed when the clover flow starts.

A colony should never be left with a double brood chamber of Langstroth depth for more than three or four weeks. If left longer the lower set of combs is usually deserted and becomes pollen clogged. On the other hand the queen should be excluded from all supers at least three weeks before extracting. This limits the time of shutting the queen below again in clover districts to about June 15th to 30th. If delayed as long as possible swarming will be practically eliminated. Some time between these dates, then, blow smoke rather freely down between the combs of B, wait about a minute for the queen to get down, and lift B off. On A place a queen-excluder and an extracting super C, then B on top and the cover. (See Fig. 3.)

Use Brood in "B" for Nuclei.

Next apiary day the brood in B is nearly all capped, and likely has a number of nice queen cells. It is now in prime condition to lift off for a nucleus according to directions given in the bulletin. In doing this no precautions should be taken to prevent bees returning to the colony from the nucleus, the brood in the latter being capped, requires very few bees to care for it, and the colony needs workers for the harvest.

A second super D, may be added to the colony if needed at the time of setting off the nucleus. (See Fig. 4.)

To Requeen the Apiary.

This nucleus should be left beside the colony for one week, or until young queens are nearly ready to hatch, then removed to another part of the apiary to rob it of its flying bees and to avoid any danger of what might be called an "after-swarm." If the queen is not one from which you care to breed, you might destroy all the cells and put in a cell from a good queen.

After the young queen starts to lay she can be introduced to any full colony, according to directions given under "Requeening" in the bulletin. This is a very good way to see that each colony has a young queen for going into winter quarters. If one is buying or rearing queens from selected stock they can be introduced to these nuclei at the time of setting off. In that case the queen cells would have to be destroyed.

Watch for Swarming Impulse Continues.

Each week after setting off the nucleus, the brood chamber A should be examined for queen cells. This may be done by simply tipping it up and looking underneath. It has been found that where combs are straight and even the most likely places for queen cells are along their lower edges, and where they are built for swarming there are sure to be some there in plain sight. Whenever any queen cells with eggs or larvæ are seen, the hive should be manipulated as follows:

Move the brood chamber A with its bottom board to one side and put in its place on the original stand the nucleus B, making sure that it has not more than one queen cell, unless all its cells are hatched and it has a young queen. On B place the excluder and the supers C and D, and if they are filling nicely and the honey flow is still good, a third super E may be added. (See Fig. 5.) Because of its removal from the stand, the colony in A with the old queen loses most of its flying bees to the working colony, gives up the idea of swarming and destroys its cells. It can be depleted still more if desired by removal to another stand on the next visit, and may be requeened for increase, or united to its original colony at the end of the season.

Making Increase.

It is not at all necessary to allow bees to swarm in order to get increase. For this purpose the combs of the brood chamber B may be divided into two or three nuclei at the time of first setting off, giving to each not less than two good combs of worker brood, one or more combs of honey, and some empty worker combs or frames of wired foundation. This may be repeated with A when it is set out. Each nucleus must be given a capped queen cell or a queen.

Giving Room in Supers.

The method of swarm prevention just described gives the queen room by taking away the brood and leaving the workers to gather honey. It is also necessary to see that the extracting supers do not get at all crowded with honey. It is most important to have plenty of supers. It saves time during the busy season and also gives a much better quality of honey to tier up supers and not extract until the close of the white honey season. On the other hand it is necessary to remove all the white honey that is ripe just before the bees begin to gather dark honey. This, in most sections, is about the first of August.

Modifications of this method have been used by some of the most extensive producers of extracted honey. In the hands of amateurs it has given various degrees of success. Of the 24 experimenters 14 reported, and where details of the instructions were carried out, the swarming was controlled to a very marked degree. One beekeeper succeeded in completely controlling the swarming, others having from 5 per cent. to 35 per cent. of swarms. In every case the crop was larger in the experimental group than in those managed by ordinary methods.

Spring Management.

Experiment No. 4.—*This is a method of Spring Management to get Strong Colonies for the Honey Flow.*

It was reported in the Annual Report for 1914, page 44.

The wet spring of 1916 was very well suited for this experiment. Even when the bees were able to fly and gather small quantities of nectar, the additional feed seems to have been profitably given.

Instructions for this experiment were sent to 64 experimenters and 26 reports were received. Even when the experiment was only carried on to a limited extent the results were satisfactory. Especially is this method valuable for strengthening weak colonies so as to bring them into shape for the honey flow. One beekeeper reported over 40 lbs. per colony from his stimulated group in advance of that received from his other colonies.

Queen Introduction.

The season was particularly favorable for the rearing and introducing of queens. The heavy flow of nectar, which was continuous for a month or more, made it easy to introduce queens by almost any method.

The same experiments as in previous years, namely, No. 6 and No. 7, were repeated and met with good results. No. 6 is described in the 1915 Annual Report, page 45. No. 7 is described in the 1914 Annual Report, page 44. On the whole, the fasting method of introducing queens seems to have met with greater success than the smoke method.

Experiment No. 9.—*Wire-Cloth Bee Escape Board.*

The bee escape is used for removing bees from supers when the honey is to be taken from the hives. It consists of a small device in the centre of a board placed between the brood chamber and supers which entirely cuts off communication except through the bee escape. The bees in the supers very soon learn that they

are separated from the brood and pass through the bee escape, where they are compelled to push their way between delicate springs which close behind them and prevent their return.

The experiment consisted of a test of what is called a "ventilated bee escape board," the ventilating feature consisting of wire-cloth in two thicknesses with space between to prevent communication of bees through the meshes. The purpose of ventilation is to prevent the smothering of bees in the super in hot weather, also to prevent the rapid cooling of combs when the escape is used in cool weather.

Thirty-four experimenters received bee escapes of this type and 18 reports were received. These seem to have all been successful with it and made such comments as the following: "I cannot praise it enough." "I would no more think of running an apiary without bee escape boards than without queen excluders."

The time required for the bees to leave the supers depended largely on the bees and the weather. On some colonies the supers would be free of bees two hours after the escapes were put in place, while others required twenty-four hours. Placing the boards in the evening and removing the supers the following morning seems to be a favorite practice. The use of an efficient escape board tends to prevent robbing and so avoids much disturbance and irritation of the bees. It saves the labor of brushing or removing the bees from the combs in other ways.

Experiment No. 10.—*Outdoor Wintering.*

Instructions for this experiment included directions for making a quadruple wintering case and the packing of the bees. It required in addition to considerable forethought and planning, quite an outlay for materials for the cases. Furthermore, the experiment had to be started one fall and continued till the following summer to obtain the results of the work. The unfavorable labor conditions on the farm prevented many experimenters from carrying out the instructions.

Outdoor wintering in Ontario is gaining in favor annually, and where the apiary is well sheltered from the cold winds and the hives packed according to instructions, very good results have followed. One great advantage of out-door wintering is the spring protection. One experimenter says: "It was decided to bring the three out-yards together into one yard and the yards to be moved were unpacked about May 15th. The other yards were not unpacked until June 7th and 8th. The cool, damp weather which followed certainly checked the unpacked colonies. They did not develop anything like the strength of the packed colonies and on every occasion I observed that the packed colonies were working better than the unpacked."

Experiment No. 11.—*New Style Wire Embedder.*

This is a small tool made of brass constructed on the plan of a soldering iron. The embedder is heated over a lamp and run along the wire, causing it to melt its way half through the foundation, and when conditions are favorable, liquid wax flows over the wire completely embedding it. It was devised by Burton N. Gates, Ph.D., Associate Professor of Apiculture, Massachusetts Agricultural College. On account of industrial conditions the supply of these tools was limited and only twenty-one experimenters could be accommodated with material. This little tool was very favorably received. While some experimenters report being able to do quicker work all agree that it does better work than any of the old style embedders. Many state that it takes a little longer time, but does better work after some practice.

EXPERIMENT No. 12.—*A method of Wiring Frames so that a Full Sheet of Foundation is held Securely Without the Trouble of Fastening it to the Top Bar.*

Top bars of frames are usually made 7/8 inch deep with what is called the groove and wedge arrangement for fastening the upper edge of the foundation. The writer has found that a top bar 5/8 inch deep has plenty of strength and allows for almost two more rows of cells on the surface area of each comb. The task of fitting the edge of the foundation into the groove and of driving the wedge home takes a great deal of time and patience. There is a double loss, therefore, in using the standard top bar—comb space and time.

To overcome this the top bar of the experimental frame is made plain and the frame wired with four wires instead of three, the upper wire being one-quarter inch below the top bar and supported in the middle by a small staple. The wires are drawn tight and one operation of embedding completes the task of fastening in the foundation.

Ten frames in the flat with wire, nails and instructions were sent to each of 76 experimenters. Seldom is there such uniformity of favorable opinion expressed about any device in beekeeping. Every one of the 39 reports stated that the experimenter considered it a great improvement on the groove and wedge method. Following are some of the favorable comments:

"I found this method very satisfactory, in fact I consider it the ideal method, and I have been using it ever since I learned of it. I did not have the slightest difficulty in nailing up frames, wiring or putting in foundation. I was thirty minutes nailing up and wiring, and between five and six minutes embedding the foundation, using a spur embedder for the purpose.

The racks can be nailed faster than the Hoffman-Langstroth frame, wired just as quickly, and the foundation placed in them a great deal faster. I also find the bees build them nicer from the top bar and make straighter combs than in the others.

I like the top bars of the frames sent and purpose having two or three thousand made this winter. It looks to me now that the wedge and groove plan was a lot of unnecessary work.

It takes less time to embed the foundation and I fancied the foundation didn't buckle as much, and I rather like the appearance of them better."

SPECIAL EXPERIMENT ON RACES OF BEES.

Seventy-four queens from different breeders were sent to that number of experimenters to test their ability to resist European Foul Brood. The queens were introduced to infected colonies and their progress is being noted. On account of the heavy honey flow the disease almost disappeared in all colonies which were not too far gone, so the test will need to be continued till next year for satisfactory results.

SUMMARY.

The following is a summary of the experiments sent out and the number of reports received:

As previously stated, the season and shortage of farm help were against this work and on this account many who derived benefit from the experiments failed to report. The reports, however, are encouraging and the effect on the production of honey of this work which has now been carried on for seven years is very marked.

Experiment No.	Experimenters.	Reports.
1	57	12
2	11	2
3	24	14
4	64	26
6	19	12
7	10	7
9	34	18
10	85	Not complete till next spring
11	21	14
12	76	39
Special	74	Not complete till next spring
Total	475	144

CO-OPERATIVE EXPERIMENTS IN WEED ERADICATION.

Prof. J. E. Howitt, O.A.C., Guelph.

These co-operative experiments have now been conducted for five successive years. The object of this work is to have carried on by men on their own farms experiments in the eradication of weeds, the results of which will furnish data from which definite statements may be made regarding the best methods of controlling the various injurious weeds. Each year early in the spring circulars are sent out inviting men who have any of the weeds included in the list of experiments on their farms to co-operate in the work. Those who sign the application forms for any of the weed experiments are furnished with detailed information concerning the carrying out of the work, and late in the fall they are supplied with blank forms on which to report the results.

Seven experiments in all have been tried, viz., the use of rape in the destruction of Perennial Sow Thistle, a system of intensive cropping and cultivation for the eradication of Perennial Sow Thistle, the use of rape in the eradication of Twitch Grass, a method of cultivation and cropping for the destruction of Twitch Grass, spraying with iron sulphate to destroy mustard in cereal crops, and a method of cultivation for the destruction of Ox-eye Daisy.

During the past five years some sixty farmers co-operated in this work. The last two years the experimenters have been fewer and the results not quite so satisfactory. This is largely due to continued wet weather preventing the carrying out of the work involved in such experiments. The following is a very brief summary of the five years' work: Experiment No. 1. The use of rape in the destruction of Perennial Sow Thistle. Total number of experimenters 13. Reporting complete success 6. Partial success 3. Failure 1. Instruction not carried out 3.

Experiment No. 3. The use of rape in the destruction of Twitch Grass. Total number of experimenters 14. Reporting complete success 7. Partial success 3. Not reporting 4.

Experiment No. 5. Method for the eradication of Bladder Campion or Cow Bell. Total number of experimenters 8. Reporting complete success 5. Partial success 1. Not reporting 2.

Experiment No. 6. Total number of experimenters 25. Reporting complete success 15. Partial success 2. Failure 3. No reports 5.

These experiments have been carried on for five successive years in many parts of the Province, on various types of soil and under different climatic conditions. The results, therefore, should be a safe index for the whole Province. They may be briefly summarized as follows:

First, that good cultivation followed by rape sown in drills provides a means of eradicating both Perennial Sow Thistle and Twitch Grass; second, that rape is a more satisfactory crop to use in the destruction of Twitch Grass than buckwheat; Third, that rape gives much better results in the eradication of Twitch Grass and Perennial Sow Thistle when sown in drills and cultivated than it does when sown broadcast; fourth, that thorough deep cultivation in fall and spring followed by a well cared for hoed crop will destroy Bladder Campion; fifth, that Mustard may be prevented from seeding in oats, wheat and barley by spraying with a twenty per cent. solution of iron sulphate without any serious injury to the standing crop or to fresh seedings of clover.

Points of interest brought out by the experiments in spraying with iron sulphate to destroy Mustard were:

1. The necessity of spraying early, just when the plants are coming into bloom. If the spraying is left too late the older plants will not be destroyed by the solution and will form seed, and hence the experiment will not be entirely satisfactory.

2. To spray thoroughly with a good pressure. In order to spray thoroughly with an ordinary broadcast attachment it is necessary to keep the horses walking very slowly. If an attempt is made to cover the ground quickly some of the plants will be missed and the results will not be entirely satisfactory.

3. In regard to the cost of spraying with iron sulphate it was found that the cost of material per acre varied from $1 to $2.40. Iron sulphate has advanced in price from $1 to $2 per cwt., so that it now costs from $2.50 to $3.50 per acre for material to spray mustard.

A Member: In regard to the spraying of mustard with iron sulphate do you think it would entirely kill the mustard?

Prof. Howitt: Yes, we have had a number of experiments and with one of them the mustard was so thick there was hardly any grain in the field. We sprayed it and the results were most satisfactory.

A Member: How many years do you think mustard should be sprayed to entirely eradicate it?

Prof. Howitt: That depends upon the kind of mustard in the field, the amount of mustard seed in the soil, and the method of cultivation practised. It will likely require three or four years.

A Member: At what stage in the life of the mustard would you spray?

Prof. Howitt: We think that for the most satisfactory results mustard should be sprayed just when the plants are coming into bloom—when the first blossoms in the field are showing yellow. If left later than this period the results will be unsatisfactory.

A Member: What proportion of iron sulphate and water do you use?

Prof. Howitt: We use a 20 per cent. solution; 2 pounds of iron sulphate and from 40 to 80 gallons of water.

A Member: How many acres would that spray?

Prof. Howitt: It takes from a barrel and a half to two barrels per acre, but, of course, it depends to some extent on how thick the mustard is.

A Member: Can you give us about the cost per acre?

PROF. HOWITT: The cost of our experiments vary from $1.50 to $2.40 per acre, but during the last year the price of iron sulphate has doubled on account of the war, therefore, the cost would be double.

A MEMBER: Then the cost would be $5 per acre?

PROF. HOWITT: It amounts to about $4.25.

A MEMBER: How about handling twitch grass?

PROF. HOWITT: The best method of handling twitch grass is to thoroughly cultivate the soil until the middle of June, thus preventing the twitch grass from making any growth above the ground. Then sow rape in drills about twenty-six inches apart, cultivating the soil between the rows as much as possible, and allow the rape to make its full growth before pasturing it.

MR. R. A. LEHMAN: I have a resolution here, passed by the East Simcoe Board of Agriculture, and with your permission, Mr. Chairman, I will read it:

Orillia, January 6th, 1917.

In view of the fact that noxious weeds have, to a large extent, been allowed to seed on highways, waste and pasture lands, and are fast becoming a serious menace to cultivated areas, we believe a special effort should be made to control them.

The scarcity of labor makes the usual method of control (that of cutting while in bloom), practically impossible; however, it is very noticeable that where sheep pasture on the roadways the majority of these weeds are held well in check, but farmers hesitate to let their sheep run on the roadways because of the loss from dogs, for which they *are not* recompensed; therefore, we, the East Simcoe Board of Agriculture, have requested our first vice-president to bring before the annual meeting of the Experimental Union, held at Guelph, January the 9th and 10th, the following resolution:

Moved by Mr. George Raikes, Barrie, seconded by Mr. Robert C. Hipwell, Orillia, that the Government be requested to amend the Act regarding compensation for sheep destroyed by dogs, so that it will apply to sheep on roadways as well as on private property.

D. A. SMITH, Hawkestone,
President.

T. F. SWINDLE, Orillia,
Secretary-Treasurer.

A MEMBER: I would like to see the roadside clear of weeds, but if farmers are allowed to run their sheep on the roadside it would entail an extra expense to the township.

A MEMBER: Yes, but allowing sheep to run on the roadside to keep down the weeds is only part of weed eradication; the fields bordering these roadsides would still be as bad as they are at present.

A MEMBER: It will certainly increase the expense on the townships, for if I am right the township now pays for the damage to sheep by dogs up to, I think, ten dollars out of the funds secured from the dog tax.

MR. HARRICK: We should, in the first place, see that the dogs are sufficiently taxed, and then we should see that our own dogs are carefully looked after. There are, however, one or two reasons why I do not think the resolution should be carried any further at this time. The number of motors travelling our country roads is very large, and there would be considerable damage to sheep if they were allowed to run on the roadside.

MR. MONTEITH: There may be some misunderstanding as to what is meant to have a statutory approval for allowing sheep to run on the roadways. I think we should be careful in this matter. The people of a large part of this Province have come to the conclusion that stock of any kind should not be allowed to run on the roadside, and in giving our approval to this resolution we may be misrepresenting the majority. While I am in sympathy with the sheep industry, and the increase of live stock generally, still, I see the danger of our Union giving approval to an Act allowing the running of live stock on the road.

POTATO GROWERS' ASSOCIATIONS IN ONTARIO.

F. C. Hart, Toronto.

There are in the Province of Ontario eight or nine Growers' Organizations producing and marketing potatoes commercially. One or two of these handle potatoes alone, the others market other farm products as well. These organizations are The Rainy River Potato Growers' Association at Emo, Thunder Bay Co-operative Marketing Association of Fort William and Port Arthur, Hillsburg Potato Growers' Association, Hillsburg, Lambton Co-operative Association of Sarnia, Independent Vegetable Growers' Association of Sarnia, Pelee Island Co-operative Marketing Association, Blezard Valley Association, Nipissing District and Farmers' Co-operative Association, Nipissing District.

At Hepworth, the centre of a small, but excellent potato growing section, there is now being organized another potato marketing association, and the United Farmers of Ontario are, I understand, endeavoring to handle potatoes in a wholesale way. One of these firms, that at Emo, initiated its business by the purchase of a carload of seed potatoes of one variety. One or two others only, however, have taken this step, but each of them has to a large extent reached the point where all its members are growing at least one class of potatoes.

The situation in Ontario with regard to marketing potatoes in the Province is well known. The Province produces about 18,000,000 bushels annually, about one-third of the production of Canada, and three times the production of New Brunswick. In spite of this fact, however, we import from both ends of the Dominion of Canada. New Brunswick potatoes, which are known on the whole hemisphere and command a market everywhere, sell for at least ten cents a bag over Ontario potatoes on our own markets. Ontario should be in a position not only to supply the Province but to export as well. At this time of national saving it is too great a waste to haul potatoes from Edmonton, Alberta, for consumption in the homes of Ontario when they can be grown here profitably and marketed economically. These facts have been known to the farmers of the Province for a long time and yet the situation has not been materially improved, and would indicate that something more than mere exhortation is necessary. The results of the operations of these growers' firms in Ontario strongly indicate that the ultimate remedy lies in the direction of organization and organization for business purposes. In every instance, where such organization has taken place, the quantity and quality of potatoes in the district has been materially increased, due of course, to the fact that each of these firms has a business reputation and a business connection to maintain and endeavors to see to it that its members maintain the quality and quantity of their product.

The individual grower, without organization, even though he takes all the expert advice as to growing one variety, spraying, and other cultural methods conducive to quality, finds himself at a serious disadvantage when it comes to marketing. Many of his neighbors are growing a multiplicity of varieties, and are not producing the quality, with the result that his district is not favorably known, and his own limited output is not sufficient to gain recognition on the market, and his financial returns, irrespective of the quality, are the same as those of his neighbors. It is this financial reason, perhaps more than any other, which has prevented the more general adoption of better methods in production. Business organizations of growers, rather than general meetings of

farmers, have certainly proved more effective in the production of quality and quantity and in the elimination of waste.

Moreover, for the individual grower to properly market there are necessary factors other than uniformity and quality, such as advertising, proper packages, transportation questions, supply and demand in the various markets, etc., which can only be known to the average grower through the manager of an organization actually engaged in the trade.

I believe, however, there is one serious defect in all these organizations which must in time be remedied. It is not enough to grow one variety in a district; there should be a grading of each member's product. The time is certainly coming when practically all of our farm products must, if the producers and consumers are to receive justice, be placed upon the market under legal grades. Until such time as these legal grades are established, as they are now established for apples, these growers' firms should establish their own grades. It would appear that the objections against the feasibility of grading potatoes are no more sound than the objections we heard against grading apples when this was under discussion. There is possibly one exception to this in the fact that apples are hand picked, while potatoes are not. There are on the market, however, sizing machines which have proved efficient and which solve the question of grading for these potato growers' organizations. As at present managed, these organizations have certainly increased the quality of the product, but because there is no grading there is a tendency for the best growers in the district to remain outside of such an organization. His superior production, due to his more expensive methods and to his initiative and intelligence, is not returned to him in a just proportion but is used to increase the value of all the potatoes shipped by the firm. Such a grower, if he is in an organization, in time becomes justly dissatisfied, and I would strongly urge upon any community contemplating the organizing of the marketing of potatoes to institute a grading system of their product and pay their members on this graded basis.

In conjunction with Mr. S. C. Johnston, Vegetable Expert in the Department, we suggest such a grading as follows:

Potatoes late. Fancy. One variety, true to type. Sound, smooth, clean, uniform in size, and not varying over one inch in diameter, and of at least medium size for the variety.

No. 1. One type of color, ripe, uniform in size but not over size for the variety, and not under two inches in diameter, smooth, free from irregularities in shape and at least medium depth of eyes, free from earth, free from blemishes caused by insects, diseases, sun-scald or by implements, and not more than ten per cent. showing any or all defects.

No. 2. One color, ripe, fairly uniform in size (not less than 1⅞ inches in diameter), fairly free from earth, not more than 30 per cent. scabby and knobby and affected by insects, and not more than 5 per cent. affected by blight or rot.

This grading is, as intimated, merely suggestive, but I wish to point out that the actual wording of such grades is relatively unimportant; the main thing is the separation of the product into definite and systematic qualities and no matter what the wording of the grades may be these qualities will in time be recognized and looked for by the trade.

The potato industry in Ontario is worth between fifteen and twenty million dollars annually, an industry well worth consideration. There are more potatoes produced than in any other one Province in the Dominion and more than the

three Maritime Provinces put together. In British Columbia, Saskatchewan, Quebec, New Brunswick, Nova Scotia and Prince Edward Island the potato is the third most important crop, and each of these Provinces sends potatoes to our markets and at enhanced prices over our domestic product. In Ontario practically every potato grower is his own market man and there are too few organized and concerted actions by the growers to efficiently place their product on the market, to the injury of producer and consumer. The solution would seem to lie in the direction of more of these growers' firms in the country, and organized on a basis that they may be able to take their legitimate place in the trade. The Department is glad to assist in such organizing and it is to be hoped that the Department will also have in its employ marketing experts who will be able to assist and advise with such firms in their actual business operations after they are organized.

WHAT ONTARIO SHOULD DO IN REGARD TO POTATO PRODUCTION.

Andrew Elliott, Galt.

Perhaps there is no factor which has had as much to do with the high cost of living as the potato crop. We have two what we may call great staple foods, wheat grain and potatoes. Unlike wheat, however, the potato crop cannot be kept for so long a period, and any great surplus of potatoes that we had in times past, in Ontario, simply meant that the price was forced down, because we had no outside market, and we were compelled to sell or give away as the case might be. Only a few years ago I bought one hundred bags of potatoes at fifteen cents a bag to feed to my stock. The farmer who produced these potatoes said: "No more potatoes for me," and he went out of the business except, of course, producing enough for his own use. Taking into consideration the fact that during the last few years potatoes in the Province of Ontario have been almost a failure, and that for years back we have been importing, would alone raise the price. We are importing potatoes from the United States, and are also bringing them east from the Maritime Provinces, from Manitoba, Saskatchewan and Alberta. My judgment is that we cannot produce such good crops here as they do out west where irrigation is used, but it costs a great deal to haul them from the west, from the centre of the Northern States, or from our own prairie Provinces to the consumer in this country. It is only when we have a potato famine that we can expect to bring potatoes from the west. We have been bringing a larger and larger amount from the Maritime Provinces, these potatoes coming chiefly from the Province of New Brunswick. New Brunswick potatoes come largely from the Counties of Carleton and Queens. Carleton County runs east and north of a great potato producing county in Maine, a county where I have seen twenty million bushels of potatoes, which is more than the whole Province of Ontario produces. The character of the soil in that district in the State of Maine is very much the same as that in Carleton County, New Brunswick. It is composed very largely of broken stone, together with some fine sand and a small amount of clay. We would call this a very inferior soil in Ontario, but it is one that seems to be able to produce great crops of potatoes of the very best shape. The farmers there, when they want to grow

potatoes, take a sod land which has not been broken up for an ordinary lifetime. On that soil from $30 to $40 worth of fertilizer would be applied per acre before planting, and when harvested the potatoes would be drawn twenty miles to the market and loaded on the train. This would be followed by a long rail haul, and the paying of a middleman to handle them in Ontario. The consumer pays for all this. Prince Edward Island is also one of the best potato growing countries I know of. The potatoes that come from the island have to be put in sacks, loaded on the car, unloaded from the car and reloaded on the boat, taken off the boat and put on the car again on this side of the Strait, and then carried a thousand miles by rail before the consumer here gets them. Now, does it not seem to be short sighted policy, particularly on the part of the Province of Ontario, with its wealth of good soil, and with an ideal climate for potato growing, that is responsible for our not growing potatoes. If we care to grow potatoes in Ontario we can do it. We have the soil, the climate, the men and the market. But there are certain things that we must bear in mind too, and in that connection I would like to say just a word about the market we must reach. Now, the market is simply a place where the producer and the consumer meet. There may be a third party, each one looking to business. Now, what does the market require? It requires, first of all, that a given district shall produce the same kind of potato, the same variety, or varieties that are especially alike in texture, size, uniformity, and a variety of things which will require what I have mentioned already—co-operation.

The only thing I have to find fault with in the splendid publication that came out this season is that there are so many varieties of potatoes mentioned that the farmer becomes bewildered and does not know what variety to grow. We must unite and grow the same variety. Then we must look out for our market. We want to have some outside market to steady our domestic market. There is a splendid opportunity for the man or men who will take up the growing of seed potatoes for the south. You know the south does not usually grow its own seed potatoes. They will take all the northern grown seed and are prepared to pay a big price for the right kind of seed. I am well acquainted with a man who has a seven thousand bushel contract for good seed potatoes, to go to Virginia, at a good price. The Virginians and Californians get their seed potatoes from the New England potato growing States, Maine, New Hampshire and Vermont; States west of the Mississippi get theirs from North Dakota, Minnesota and Wisconsin. In Western and Northern Ontario, and the great Muskoka District in particular, there are splendid hidden possibilities for the producing of seed potatoes for the Southern States.

In planting, if I had a hill containing potatoes all about the same size, ranging from an inch and a half to two inches in diameter, I would just as soon use those potatoes as I would the large ones cut into sets, because these small potatoes have the large potato instinct, but have been crowded and have not had an opportunity to develop. On the other hand, in another hill of potatoes you may find some large and badly formed potatoes, and a large number of small potatoes. These small potatoes have the small potato instinct, and I would not care to plant them. It simply works out this way: if you mix large and small potatoes you will find that four-fifths of the small potatoes have the small potato instinct. How many of us realize how much a crop of potatoes depends on the proper choice of seed. Let us continue to aim at the ideal, because the law of atavism occurs in plant life just as surely as it does in animal life. If

you plant seed that you know is defective you may be sure you will get a crop that is defective. Get your seed from the right kind of potato. Let us be careful not to select our seed potatoes from weak seed. Do not select potatoes that run to a point for one of your seed potato beds. That potato is endeavoring to revert to the original type, and if you take potatoes of that kind and plant them you will produce a large amount of defective potatoes. Potato sets should contain one or two eyes and should be properly cut. If you take a potato that has a stalk running from the outside into the centre of the potato, and cut that stalk close off below the bud, you may have a large piece of seed potato left, but that bud has had its roots cut and cannot feed upon the sap in the piece of potato that is supposed to give it its vigor and vitality. It will grow, but will produce a poor plant. In cutting these potatoes make them as nearly square as possible, but let that stalk running to the centre of the potato remain intact and be as nearly as possible in the centre of the piece.

If I wish potatoes for the early market I give them a good start in the spring, by putting them in the light, but not the sunlight, three weeks before they are planted. During that time they will develop a number of vigorous green buds, and when they are placed in good soil for potatoes, they will make a rapid growth. I plant these potatoes shallow because the heat of the soil will help the potato. With the late potato I should do differently. I would plant the seed later and deeper, and would not interfere with them to any great extent in order to keep the heat out of the soil at the time the potatoes were making development.

Just a word about the diseases and other enemies of potatoes. We are fortunate in Ontario in not having as many diseases as are found elsewhere. We have the two blights, early and late, but these can be completely controlled by thorough spraying. We have the insect known as the potato beetle, but it also can be easily destroyed by spraying. One spraying does not kill the potato blight, but a thoroughly sprayed field of potatoes will pass through a period of rot untouched. In my own experience some years ago, we had ten acres of potatoes in half-acre plots. Some plots were not sprayed at all, some others were sprayed once, some twice, and so on, until one plot was sprayed six times. That year the potato rot was very bad, indeed. In those plots which were not sprayed at all the potatoes were entirely destroyed, in those that were sprayed once or twice the potatoes were badly damaged, but in the field that was sprayed six times scarcely a rotten potato could be found. On reasonably well drained land that treatment will prevent the rot. Then we have Black Leg, or "Little Potatoes" as we call it. The only way to treat this disease is to pull up and burn all the plants that are affected, and if any of them are left you will have a certain amount of your potatoes diseased. I hope to see the time in Ontario when, instead of sending out thousands of our hard earned dollars annually to our good friends in Nova Scotia, New Brunswick and Prince Edward Island, as well as to our north-west and across the line, for potatoes, we will be able to produce a surplus to send to other parts of the country and to our sister States across the line.

Prof. D. H. Jones: I have wondered the last few years how it was that in Ontario, where the soil was so rich, where we have had numberless demonstrations showing that the potato can be grown profitably, we have had to import into the Province from the East and West and South the very potatoes needed to supply our table. I wondered if it was due altogether to the greater tendency

towards disease developing in the potato. The review of potato culture that Mr. Elliott has just treated us to gives the answer to that question. The farmers found that they could not get adequate payment for their crop. We realize now, however, that there is a great demand by people who are willing to pay a satisfactory price for potatoes, and that being the case there should be no objection, on the part of the farmers, to again make the potato one of their staple crops.

I presume the reason why Dr. Zavitz asked me to lead in this discussion on the potato crop of Ontario was that, during the last two years, my attention has been directed to one or two diseases occurring in the potato crop during that period. Mr. Elliott referred to a fact which has again and again been proved; that both the early and late blight of potatoes can be controlled by adequate spraying, providing there has been a good selection of seed. Most of you are familiar with the appearance of the late blight on seed potatoes. This varies according to the extent of the disease. At first it appears as brown spots upon the outer surface of the potato, quite frequently around the eyes; if the disease is very advanced these brown parts will be more distinct, and it is comparatively easy to pick out a potato that has this disease well advanced, but it is not easy to detect it when the disease has just started. We did not find any late blight in the diseased potatoes submitted to us during 1915 and 1916. Mr. Elliott also mentioned a disease frequently referred to as "Black Leg." Two years ago, in the early part of the summer of 1915, we had sent to us for examination quite a number of samples of plants apparently suffering from this disease. We had around the College here, both in the College crop and in the crops of the neighborhood, quite a number of plants similarly affected. Black Leg of potatoes is recognized as a bacterial disease. The bacteria get into the growing potato plant, either from defective seed, or else from the soil when the plant is young. It is more difficult to determine a seed potato suffering from this disease, than it is to determine a potato that is suffering from the late blight. In extended examinations of the specimens of plants that were sent to us during the summer of 1915, and those gathered in the neighborhood of Guelph, we found that the disease with which most were affected was not of the bacterial type. We found bacteria present but concluded from our experiments that they were not the cause of the disease in many cases. We found, as a result of conducting a number of experiments, that the disease which looked practically the same as the bacterial Black Leg was due primarily to a fungus, known as Rhizoctonia. In most cases we examined we found indications of this Rhizoctonia present in the diseased tissue. We conducted experiments to determine whether this fungus or the bacteria were responsible for the disease. We took several diseased potato plants from a field and put them in soil with clean, healthy seed tubers that had been dipped and rendered free from contaminating organisms. The plants which developed were healthy—until they were four or five inches above the soil—then the leaves began to curl a little and they lost their bright color. Looking down in the soil we found the stem turning black and cankered. On taking some of that discolored tissue we found it was permeated with Rhizoctonia fungus. We found, in other experiments, the bacteria which were present could not enter the uninjured tissue. Another experiment that we made in connection with this disease was to see if dried out diseased plants would produce the disease when mixed with soil in which sound tubers were planted. We brought a number of diseased plants in from the field and allowed them to dry out. When thoroughly dry they were broken up and mixed with soil in which healthy seed potatoes were planted.

Practically the same results as before were found, that is, black cankers, very like Black Leg developed on the stems and in the cankered tissue. Rhizoctonia was found to be the cause.

Another way in which this disease may enter the plant is from defective seed potatoes. The fungus which causes this diseased condition does not materially affect the tuber directly, though it affects the crop of tubers in that it injures the stem of the young plant and prevents food material passing from the top of the plant down into the root. If the plant should not be entirely killed by the disease when it is young, then we are apt to get what is known as "Little Potatoes," and a reduced yield of commercially-sized potatoes, and the potatoes will be more or less covered with a brown or black scab. You will notice that a potato tuber which has this disease present has a black scab, sometimes small and sometimes large (specimen exhibited). This black scab does not penetrate the skin of the tuber, and so does not affect the tuber itself directly. At first sight this scab looks something like a bit of soil adhering to the potato, but, on being rubbed with the hand, will not remove as a piece of soil will be removed. If we dip it in a dish of water we find it becomes black, and, should that seed be sown we are liable to get a plant suffering from black canker. In planting seed potatoes such as these, that have a black scab on the surface, we found the same results as before described. I wish to drive home this fact: seed potatoes apparently sound, which have on their surface these little black scabs (specimen exhibited) are apt to produce plants suffering from the black canker very like black leg, and should not be planted without being treated. The ordinary dip used for common scab of potatoes, that is formalin, will not readily destroy the black scab of this disease. In order to be sure of the scab being destroyed, it is desirable to soak the potatoes for three or four hours in water, and then soak them in corrosive sublimate, 1-1000. This should be done in a wooden tub or enamel pot and the potatoes treated should never be used for any other purpose than for planting, as corrosive sublimate is poison.

In the early part of the season of 1915 potato growers suffered heavy losses from this particular type of black leg or black canker. Later in the season, about harvest time, there was found to be present a considerable amount of rot amongst the potatoes being harvested. I have here types of such potatoes. Here we see a combination of attacking forces, both the fungus and the bacteria. There is no means of destroying this disease when it is present in the growing crop—spraying for this disease or black leg is of no use whatever. The organisms responsible for it are present in the underground parts of the plant and in the stems and we cannot get at them by spraying, hence, in guarding against black leg and black canker or Rhizoctonia what we have to look after is freedom of the seed from a diseased condition, or black scab, such as is here represented. A complicating factor in the development of the disease of the plant after once it gets established, is a water-logged condition of the soil. Of course during 1915 it was a difficult matter to keep the average farm free from a water-logged condition, owing to the copious rains that fell. During 1915 I was on a farm which had a sandy soil, and the farmer had about the finest crop of potatoes he had ever produced; with heavy land it would have been quite different, but with this light sandy soil more than nine-tenths of his crop was good heavy solid tubers. There were, however, in the field two small depressions which were not underdrained, and in these depressions we found the only samples of rotting potatoes that were in the field. In the potatoes from these two depressions I found

not less than four distinct diseases—three fungus, and one bacterial. If these depressions had been underdrained it is a hundred to one there would have been no disease, whatever, on the farm. Another important point, if you wish to secure a good crop of potatoes, is that the land should be underdrained so that it may be aerated, the reason being that where we have a water-logged condition of the soil there is not the proper aeration, and consequently not the proper bacterial development. There will be present in this condition of soil a certain amount of acidity, which farmers refer to usually as sour land. A sour condition is most exceedingly favorable to the rapid development of fungus diseases of the potato. Good underdrainage, or surface drainage are the best preventatives.

Another factor in the production of a first-class crop of potatoes is frequent cultivation. Last season, while we had abnormal rain in the early part of the year, in the latter part we suffered from an acute drought which consequently spoiled the potato crop. In the neighborhood of Guelph there was a farmer who contended that he had as sound a crop of potatoes as he ever had, and was putting them on the market at Guelph in the early part of September at $2.20 and $2.25 per bag. On enquiry as to how he had managed to get such good results in comparison with his neighbors, he said he had plowed in a cover crop of rye, and, after getting the soil in good condition from cultivation, planted his potatoes. That cover crop of rye gave an excellent mulch, and prevented much of the evaporation of the moisture. In addition to that he cultivated frequently, keeping a fine powder mulch on the surface. These factors, then, should be borne in mind: if we are to get the maximum results from our potato crop we must have clean seed well selected, well prepared land and good and frequent cultivation, particularly in a dry season.

A Member: Has Prof. Jones any data regarding the time the disease is liable to last in the ground, or whether it would affect a crop of a different kind, and has he any information as to the exact type of the disease?

Prof. Jones: There is not much experimental data as to whether this particular Rhizoctonia will affect other plants or not. Those seed potatoes which I mentioned in the experiments, I planted in the very best of soil, and in every case the Rhizoctonia type of Black Leg developed in the plants. Sometimes not until the plants were fairly well developed could we see the development of the disease, but eventually all the plants collapsed as a result of this Rhizoctonia touching a diseased eye or other part of the tuber. How long it would remain in the soil I cannot state.

A Member: The Irish Cobbler was recommended, but we grow the late potatoes.

Mr. Elliott: The popular varieties in the great potato districts of Maine, New Hampshire and Vermont, for a good many years have been the Irish Cobbler, an early potato, and the Pan American, a late potato. In my remarks I overlooked one of the most important points in potato growing, and that is, the preparation of the soil. I have no hesitation, whatever, in saying that the best crop to precede the potato is a good clean clover sod. I would like to say something more about clover. I have nothing whatever to say against alfalfa, but a great deal in favor of it. However, from my experience and observation, I find there is no plant to-day equal to red clover as a friend of the farmer. It is a plant that will yield a good return in food for live stock, and the possibilities of it as a fertilizer for the farm are beyond calculation. A three-year rotation with clover as a crop is my ideal. We have had a three-year rotation on our

farm for thirty years, and could not get along without it. I have seen wheat and barley go down because the clover did so much for the land in the way of supplying nitrogen. Nitrogen is the most expensive element you have to supply to the soil. The commercial article costs twenty cents per pound, but you have it without money and without price if you only plant your fields with clover. A number of years ago I was sent down to the State of Maine. At that time the people knew practically nothing about cultivation. They were growing potatoes the old way, putting in two, three or four crops of potatoes after sod, and trying to renew the fertility of the soil by the forces of nature. I told them to try clover, but they were skeptical and did not seem to think there was anything in it. However, once they had been persuaded to try it they almost invariably used a clover sod. Turning a crop of clover under in a green state will, I believe, prevent the ordinary scab in potatoes. Then again, by turning clover sod under the amount of other fertilizers can be reduced. A crop of oats, seeded down to clover, followed by potatoes, is an ideal three-year rotation not only for the growth of potatoes, but for the successful production of any other crop. This problem of how to maintain the fertility of the soil and grow the very best crops can be effectively solved by this rotation, and a careful preparation of the soil.

A MEMBER: I would like to ask Prof. Jones when to spray for late or early blight, and also if this blight is more prevalent in some districts than in others, especially in the south and east?

PROF. JONES: In regard to spraying potatoes, it is very desirable to spray both sides of the leaf. It is fairly difficult to do this, but by spraying both the upper and the lower surface of the leaves you get a better protection against the disease. It is not a curative but is a protection. Yes, the disease is liable to be more prevalent in some districts than in others, but I have no data as to the districts in the United States or Ontario where the blight is most prevalent. We are liable, however, to get samples of potatoes suffering from blight from almost any district. It is more prevalent in districts where it has been for some time and has not been combated.

DR. ZAVITZ: In referring to the bulletin which we issued on Potatoes last year, Mr. Elliott spoke about the large number of varieties mentioned. I am just as anxious as any one to keep the number of varieties down. We certainly have tested a large number of kinds, some 163, but if you look carefully into the bulletin you will find that only one heads the list, and you will notice that the attention of the reader is focused on a very small number of varieties. We have far too many varieties. In early potatoes, I would say select the Extra Early Eureka or the Irish Cobbler; in late potatoes the Davies' Warrior or Empire State. The Empire State is a good yielder of excellent quality, but it is not as free from rot as some other varieties. The Davies' Warrior, which stands now at the head of the list in yield per acre, came from the South of Scotland, and is not only of good quality and an excellent yielder, but it is the freest from rot of all the varieties which we have tested. The Dooley has done well in the potato growing district of Caradoc, in Middlesex County, and also in Wentworth County.

A MEMBER: What about seed? Are we going to use our own seed, or are we going to import it from the Maritime Provinces, or from the West? Our crop was rather late last year.

DR. ZAVITZ: My suggestion would be to use Ontario seed of the best varieties which is free from disease.

MR. BROUGHTON: I am a large potato grower, and have been very much interested in the addresses. I have been engaged in co-operative work for some nine or ten years, and I suppose you would be interested in knowing how I started. I have been a potato grower from 48 to 50 years, and started in the co-operative business as a result of some literature I found in the Old Country on the subject. I discovered that while you may succeed fairly well in growing potatoes, that is only one part of the operation. I found that marketing was even more important. There is a great deal of work in organizing and carrying on a co-operative business of any kind. I started out by myself at first, but soon found that I could not do it alone and had to get assistance. I got a few farmers together, and when they saw I was making a success of it they were very anxious to come along, and from that time until now, a period of about ten years, we have been shipping an increasingly large quantity of potatoes until last year there were shipped some 12,000 bags of potatoes out of our little township.

A MEMBER: When shipping potatoes do you ship them in carload lots; are they graded, and do you ship to anyone who wants to buy from you?

MR. BROUGHTON: Yes, we ship potatoes in carload lots, and forwarded a carload to Guelph last summer. We had in 1915 some one hundred growers in the Association, and it is very difficult to get them all to do just what is wanted. For instance, in the matter of grading, it is impossible to supervise this when one is digging in the field. Potatoes are dug, packed and shipped out sometimes in twenty-four hours.

A MEMBER: The difference in the varieties would make a great difference in grading. Do you put in potatoes of any size above a certain standard, or do you try to have them as near the same size as possible?

MR. BROUGHTON: The proper way of grading is to have quality first and uniformity of size afterwards. We have too many varieties. The Early Ohio, the Irish Cobbler and the Extra Early Eureka are the kinds we grow chiefly.

A MEMBER: Do you supply your members with seed?

MR. BROUGHTON: Generally. We usually have from two to three acres of seed.

A MEMBER: What about the seed from other places, will it be diseased?

PROF. JONES: A short time ago a sample of potatoes was sent to the College to be tested. The buyers had secured a carload from Prince Edward Island in the fall, and every specimen that was sent to us was badly diseased, forty per cent. being practically bad. Prof. Howitt and I went down to the Toronto potato seed market to see how much of the Ontario seed was diseased, and we found that there was none on the market. However, we looked over quite a number of samples of imported potatoes and found a considerable percentage diseased. We discovered very few that had the late blight. When we went from the seed house to the car tracks we found the same condition existed there, a considerable percentage of the potatoes being diseased with mostly dry rot. I think the seed potatoes from the States or other parts of Canada, the Maritime Provinces or the West are just as liable to have disease as the potatoes grown in Ontario.

MR. BROUGHTON: What we want to-day is some one who will make a specialty of growing seed potatoes for Ontario. We have the Parry Sound, Nipissing and Muskoka districts where we can grow this seed.

A MEMBER: What is wrong with your own seed grown at home?

MR. BROUGHTON: We use a lot of it, but northern grown seed will give better results.

A MEMBER: What is your opinion as to the size of potato sets for planting?

MR. BROUGHTON: I prefer only two eyes in each set.

A MEMBER: I think that imported seed gives the best results, that is, seed from some other district.

MR. BROUGHTON: Exactly, and I cannot explain why, but I have found from experience that seed from other districts gives the best results.

PRODUCTION OF GRAIN FOODSTUFFS.

HON. NELSON MONTEITH, STRATFORD.

The subject which has been allotted to me this afternoon to make a few remarks upon is of very great importance to the Province of Ontario, especially at this time when the world-wide cry is for foodstuffs. At the outset I may say that there has been a serious falling off in the production of wheat during the past year, 1916. I notice the latest returns would indicate that we had a deficit of about ten million bushels as compared with the previous year, which was a banner year in the Province. I also notice that in the production of wheat there were well defined areas upon which wheat was produced in large quantities. Some counties have maintained a fairly high yield, notably the Counties of Essex, Lambton, Welland, Bruce, Simcoe and Huron, and the middle Counties of Oxford, Perth and Waterloo. Now, the fact has apparently been gradually brought home to the farmers in these areas that wheat production is even yet a profitable side line in farming. We have been farming now for over half a century in the Province of Ontario, and have gradually come to realize that the production of food is on a reasonably profitable basis, still for many years the production of wheat was not looked upon in Ontario as of any great scientific importance to agriculture. Wheat gives a large amount of roughage, and in live stock areas, such as the counties mentioned, it has meant much in the economic feeding of live stock and the subsequent upkeep of our farms. By using it for bedding and feeding the grain to hogs and other stock it has given a good return. Even at the very low prices of the past it has been found to be a satisfactory and profitable line of production.

The pea crop has seriously shrunken in area, in fact, during the past year I find that Ontario's crop was under the two million bushel mark. The counties apparently that have maintained a reasonable production of peas are Bruce, Grey, Victoria, Peterborough, Renfrew, Simcoe and Durham. That indicates, to my mind, that there are certain areas in this Province that are more suitable to the production of peas than others. The growing of peas some years ago was looked upon as tending to the upbuilding of our farm fertility. We have land that can be improved by the growth of peas, and the farmers should be encouraged to bring back the very large production that Ontario had years ago when we averaged over ten million bushels of peas per annum.

During the past year as high as $6 per bushel has been paid for beans, which should give a very profitable return, indeed, for this line of production. Elgin, Kent and Huron are the chief bean growing counties, but many farmers are now growing beans in a small way in other parts of Ontario who hitherto have never given any attention to the crop. I believe there is room for still wider expansion along these lines of production.

THE HOME VEGETABLE GARDEN.

A. H. MacLennan, O.A.C., Guelph.

As Bulletin No. 231, published by the Department at Toronto, contains full information on this subject, I am not going into details. Two years ago while at Macdonald College, Que., I wrote a bulletin on "The Farmer's Garden," a copy of which could be obtained by writing to Macdonald College. This bulletin is small in size but contains much information in condensed form, and also many photos which make it easier for the farmer to grasp. Last year I had occasion to travel over the United States and the Eastern part of Canada, but I must say that I very seldom saw a farmer with a good garden. There is no particular reason why the farmer should not have a good garden. The only possible reason is that he is pressed for time in the spring of the year. It seems to me, however, that even the busiest farmer could find time to put in at least a small garden. If we but remember that vegetables lose fifty per cent. of their quality in ten hours after being taken from the garden we would all grow our garden stuff. If more vegetables were used in place of the large amount of meat and pastry usually found on most farmers' tables it would be much better for the health of all concerned.

There are two types of gardens. The first is the farmer's, which should be of generous size, and cultivated with a horse. The second type is that of the city garden; it is generally of small size, often not more than ten by thirty feet. The gardener here should get as many crops in the season as possible from this piece of land. I saw a garden, outside the city of Boston, only thirty by sixty feet, where the man had three crops growing at one time. Early cabbage was planted eighteen inches apart in the row and eighteen inches between the rows of cabbage were rows of lettuce, and between the plants in the cabbage rows were Dutch sets. The onions and lettuce would be removed before the cabbage would require the ground. Such gardening requires an exact knowledge of the period of growth of each vegetable, soil in a high state of fertility, and plenty of labor. A good many more gardens could be made in the spring if plans were drafted on paper during the cold winter days. There is no use of a man trying to plan a garden when he is planting. Make your plans in the winter time and buy your seed as early as possible. The seed crop this past season was light, so if you desire the best you must order early. The seed houses are not printing as many catalogues as usual owing to the scarcity of paper, therefore, you should send at once to your seedsman for a copy. Order only the standard varieties, lists of which have been published frequently, and may be obtained here, or at Toronto.

There are certain crops which have to be started in a hot-bed or cold frame, such as tomatoes, melons, early cabbages and cauliflowers. In this past summer's work, when trying to get at the exact cost of production and net returns, we found that three inch paper dirt bands produced the largest tonnage per acre in tomatoes at the least cost. This work was on a field scale, and we used nearly 15,000 of these bands so that the results should be reliable. Any printer can cut them out of heavy manilla paper. Have him cut them down half way on one end, and half way up on the other side, each cut being about one-half inch back from the end. Then join the ends. Make them any size you like. Have flats 12 inches wide, 18-24 inches long and 3 inches deep in which to place them. The advantage of these paper bands lies in the fact that in transplanting into the field you do not disturb the roots, and the plants do not know they have been moved. When you move those grown in an ordinary way you cut away about half the root system.

Set out with the root system undisturbed, the plants will begin growth immediately, and develop quickly; but where you disturb or cut the root system, the plant, before it can start growing, must overcome the injury you have done it by producing new fibrous roots before it can make new growth. These bands are comparatively cheap, the three-inch size costing about $2.00 per thousand. There is another appliance somewhat similar to this which is known as a paper pot. Personally, I do not like them. The pot bottom has a tendency to stop the plant development, but where you have no flats, the paper pot is very handy to use, as it can be moved without any of the dirt.

Many of us are accustomed to the ordinary field methods of using fertilizers. The one thing to be remembered in garden work is that the plants, in order to give the best returns, must be grown much more quickly than the ordinary field crop. This means that you must have more available plant food in the soil than for a field crop. For that reason I would advise you to use all the well rotted manure you can get. From thirty to forty tons per acre is not too much. To this add six hundred pounds of 16 per cent. acid phosphate per acre, which should be put on while cultivating the soil before sowing the seed. Nitrate of soda applied just after the plants have begun to grow will give good results on most crops, especially in the early season. It is merely a question of getting the plants to grow as quickly as possible which gives the quality desired.

When I make the statement that a cucumber plant is ninety-six per cent. water, it indicates something of the moisture requirements of plants. It has been found that a hill of cucumbers of three plants, about two and one-half feet long, will take up half a barrel of water—about twenty-one gallons—in three days. All plants should have sufficient water. Many people think that the plants should be soaked, but I would just as soon have a plant too dry as to have it drowned. It can be killed either way.

There is one other thing I would like to mention. In harvesting the vegetables do a large share of it in the early morning. You will be surprised to find how much the quality of the vegetables is improved when gathered while still chilled with the night air as compared with those picked later in the day.

MR. LEHMAN: Are beans troubled seriously with disease in Ontario?

DR. ZAVITZ: The crop, especially in the south-western part of the Province of Ontario, suffered serious damage caused by an attack of anthracnose in 1915. This is a fungus disease which attacks the outside of the pod, penetrating and injuring the bean, and very much reducing its market value. As last year was dry it was not so favorable for the development of anthracnose, and we found that the beans were almost free from the disease. This winter we only found a slight trace of it and I think we have enough clean seed for another year. The bean crop is an excellent one to grow, and is produced in many places now where a few years ago we thought beans could not be grown.

MR. MCLENNAN: In regard to the production of cabbage this year, the crop in many sections was almost a failure. In the vicinity of Montreal, however, they had a good crop. Very hot weather and an attack of yellows have been the chief cause of failure this year. Cabbage in any ordinary season is one of the best paying crops.

A MEMBER: In Northumberland County they had a good crop of cabbage, in fact the best in a number of years. It is a crop that can be grown on land that cannot be used for early sown crops. Cabbage may be sown as late as the first of July. The seeds are sown broadcast and the plants are simply pulled up by hand and transplanted with a machine. They are quite easy to harvest. I think I

would sooner harvest cabbage than any root crop. The one great drawback to the cabbage plant is that it is an exceedingly difficult crop to store. Those of you who have been in the habit of storing cabbages and other vegetables know that the other vegetables can be stored any place where they will be protected from the frost, but cabbage must be stored where there is ventilation, and for this reason are generally hung on poles or rails and not laid on the floor. In feeding cabbage to cattle I find almost any quantity may be fed to steers, and it is one of the best feeds for dairy cattle. I do not know of any other food that will give as much milk as cabbage. We fed our dairy stock sixteen tons in 1914, and they were particularly benefited from the succulence of the feed helping to balance their other food. In regard to seed, the very best quality could be purchased in Denmark before the war started for about 75 cents per pound, but if seed is bought in Ontario it will cost not less than $2.25 per pound. The task of thinning out an acre of cabbage is about the same as it would be for an acre of turnips. It is easier to get a good crop of cabbage than it is of turnips, so that the cost of raising an acre of cabbage would be about the same as raising a good crop of turnips.

MR. MARSH: It is almost impossible for the farmer to grow cabbage on a field scale, and build a place large enough to store them, at a profit. Could we not get a market in the United States? I understand that in the States where the yellows seriously injure cabbage it is almost impossible to grow the crop. I think we could ship to the United States, pay the duty, and still make a profit on cabbage.

PRODUCTION IN ONTARIO OF ANIMAL FOODSTUFFS.

PROF. G. E. DAY, O.A.C., GUELPH.

For many years we have claimed that agriculture is the foundation upon which the general welfare of the nation is built, but it has taken a world war to really convince everybody of the truth of this claim. The result is that the flood gates have been opened and a huge torrent of advice has descended upon the devoted head of the farmer. Some of this advice has been good, and some has been bad, but the great bulk of it has been absolutely useless. What I have to say to-day, however, is not altogether advice, but rather a feeble attempt to hoist a danger signal in the way of a train of happenings which seems to have got upon the wrong track, and is likely to end in disaster if not checked. I refer to the alarming decrease in the numbers of farm animals in Canada. This decrease has been going on for a number of years, and this year promises a larger decrease than its predecessors.

Before an audience of this kind, it is not necessary for me to enlarge upon the functions of live stock upon our farms, but I would like merely to enumerate some of them:

1. Helping to feed and clothe our people.

2. Keeping up the fertility of the soil, and hence lowering the cost of producing crops.

3. Returning to the owner higher prices for farm crops than could be obtained, as a rule, by marketing crops directly.

4. Giving returns in cash for much material which, had it not been fed to stock, would have had no market value whatever.

Other points might be enumerated, but the ones mentioned should suffice to illustrate the immense importance of live stock to the farmer.

Fortunately, we have a large number of thoughtful farmers who appreciate the value of stock, and are holding on to their usual number, or, at least, as many as they can. This is the hopeful feature of the situation, and such men are bound to reap a reward.

Those who are depleting their farms of stock may be divided into two classes: (1) Those who are compelled to sell, and (2) those who are selling mainly because the prices of feed are high. To the first class I have nothing to say, except to offer them my sympathy, but to the second class I would like to offer a word of caution.

Before a man parts with his stock he should ask himself a few questions such as the following:

(1) Are the unsatisfactory results I am obtaining the fault of the animals or of my methods of feeding and management?

(2) Am I absolutely certain that I am obtaining for my grain, hay, straw, etc., by selling same on the market, more than I could have obtained had I used them in maintaining good live stock?

(3) Supposing I do get a little more cash by selling my produce directly off the farm, how about next year's crop, and the years which follow? How am I to keep up my yield and keep down the cost of production?

(4) In the very trying season of 1916, which farms produced the best crops, those which have been heavily stocked for years, or those which have been lightly stocked?

(5) Will not my action and that of others like me, in throwing overboard my stock at this juncture, result in greater scarcity of stock and in greatly enhanced prices?

(6) When it becomes absolutely necessary for me to restock my farm, and I am paying famine prices for animals for this purpose, will I not wish I had held on to the good animals I let go in 1916 and 1917?

Surely a careful consideration of the questions submitted should convince us that we will be acting in our own best interests if we, at this critical time, hold on to as many of our animals as we possibly can, striving, to the best of our ability, to maintain our herds and flocks at their normal level. Agriculture is supreme in its importance in the world to-day, but let us not forget that our live stock is the main factor in maintaining a really prosperous agriculture. There is no occasion for panic, and the Canadian farmer has every reason to regard the future with confidence, if his farm is carrying its normal complement of live stock.

DAIRY PRODUCTS IN ONTARIO.

Prof. H. H. Dean, O.A.C., Guelph.

An American scientist has recently said, "Milk is the yard-stick of nutritive efficiency." All food products for humans may be measured with the milk-rule as a standard. The reason for this is that milk is a product of *live,* life forces, whereas other foods are the result of *dead* life, if such a term may be allowed. By this we mean that milk is formed by an animal while alive, and it continues to throw off these life particles more or less continuously for a number of years. Not so with any other class of animal foods except eggs. This is the reason why milk and milk products, like butter and cheese, and eggs are in such great demand

as human food. There are no satisfactory substitutes for these. They contain "vitamines" found nowhere else in such available form for nutrition of mankind, particularly young humans. Recent scientific research has shown that there are two substances necessary for the growth of an animal. One is contained abundantly in milk-fat, to which the name "fat-soluble A" has been given temporarily, and the other is found in skim milk, to which the term "water-soluble B" has been applied. These substances are also found in other foods, but they do not seem to be so readily made use of by the animal as in the case of milk.

Another important factor to be considered in milk and its products is the high protein efficiency of milk. Dr. Hart of Wisconsin says that the cereal grains furnish about 30 per cent. available protein and milk 65 per cent. The waste proteids are 70 per cent. in cereals and but 35 in milk.

In countries where the people live largely on polished rice or corn certain diseases are very prevalent which are now recognized to be largely the result of mal-nutrition. At the present time the United States Government is making a special effort to establish dairying in the Southern States, probably with a view to counteracting the effects of a non-milk diet among the inhabitants of the "Cotton States."

In Canada, if we would build a virile nation, the people, especially the children, must be supplied with an abundance of milk and its products. Hence the farmer of Ontario may be assured of a market at paying prices for all the goods he can produce. This assurance of a steady and profitable market is an important factor in successful farming.

There are four chief lines of dairy products in Ontario—milk and cream for direct consumption, the manufacture of butter, cheese-making, and the making of condensed milk. A word on each of these.

Town and City Milk and Cream Trade.

The abnormal growth of towns and cities has unbalanced production and consumption of milk to such a degree that we have been face to face with a milk famine during the past two months (November and December, 1916).

As a consequence, milk has risen to unheard of prices—$2.00 to $2.50 per 8-gallon can to the producer and 10 to 12 cents per quart for the consumer. Compared with the cost of production and the price of other foods, milk is not unreasonably high in price. It has been proved in the New England States that farmers were receiving less for their milk than it cost them to produce it. In consequence, there was a "milk strike" in the autumn of 1916, in which the farmers by organization were able to obtain such an advance in prices from the milk dealers as to make it worth while to keep cows. On the other hand the consumers are being educated to the point that "ten cent milk" is a cheap food. Another line of education badly needed by consumers is the fact that they may not expect to buy both milk and cream in the same bottle at milk prices. A food specialist of the United States says: "For table use, milk containing a smaller proportion of fat is much to be preferred." If people desire cream they should be willing to pay for it and not expect the milkman to furnish cream free and be paid for milk only.

Another common fallacy among consumers is, that "a real food is something you have to chew." Milk is a food and you do not have to "chew" it. It is also easily digested and quickly assimilated.

There are many difficulties in the milk business which must be solved by

producers and consumers. Without going into details it looks as if the milk business will, in the near future, be controlled and managed by the municipality (town or city), similar to the plan adopted for water supply, gas, electric light, street railway system, roads, etc., thus doing away with unnecessary duplication of plants and excessive cost for delivery. The cost of delivering a quart of milk is estimated to be not less than two cents. To a large extent this is caused by having from five to twenty-five milk wagons going over the same street, where one wagon could do the work at very much less cost. "Daylight delivery" is another improvement that cannot come too soon.

Butter.

The world needs more butter and better butter for oiling life's machinery. We do not need butter substitutes of any kind. The use of oleo, cottonseed oil and similar products as food for Canadians will lower the physical and mental status of our people. To those who think butter is too high in price during winter the remedies are: 1. Pack in crocks, tubs or boxes, sufficient butter during the time of plenty and comparatively cheap prices, for use in the time of scarcity and high prices. The packing of butter seems to be a lost art among modern housekeepers. If less time were spent on "frills" and more on learning the essentials of good housekeeping it would add to the health of our people and to the happiness of Canadian homes.

2. The larger remedy is for the Government to establish or control cold storages where human food products may be stored during times of large production, and be sold at the cost of storage and distribution in times of scarcity, thus doing away with the monopoly of foods which characterizes present conditions.

Cheese.

Cheese, or life-meat, is receiving more attention at the present time than ever before in the history of the cheese business of Canada. The world is beginning to realize the value of cheese as a concentrated food. An unforeseen difficulty has developed in the manufacture of cheese, namely, the limited supply of rennet. One of the largest manufacturers of rennet in a recent circular says: "It is impossible at the present time, and in all probability will be difficult for years to come, to produce sufficient rennet extract to go around."

In consequence, this and other firms are offering substitutes for rennet in the form of pepsin in powder and solution, and a rennet enzyme. Of the various substitutes we have tried in the Dairy Department of the College a mixture of rennet and pepsin has given the best all-round results. The rennet seems to be necessary to digest the curd, and the pepsin, no doubt, will aid in the digestion of the cheese.

To producers of cheese-milk we would offer the suggestion, that in addition to the usual points to be observed such as keeping the milk clean and cold, rainwater should not be allowed in milk, as it makes coagulation of the milk more difficult and lessens the yield of cheese.

One pound Cheddars and a variety of soft and fancy cheese, including cheese made from skim milk and buttermilk, offer a wide field at present in the manufacture and sale of this line of dairy products at remunerative prices.

However, there is a great waste of human food in the manufacture of both cheese and butter, where the by-products are not properly utilized. As an example, the Province of Ontario is making in round numbers about 125,000,000 lbs. of

cheese annually; during the same time there is being run into the whey tanks of our cheese factories nearly an equal weight of solid material, of the most valuable human food ever prepared by nature. For each ton of cheese produced there are approximately nine tons of whey which contain about 1,260 lbs. of milk solids. About 40,000 tons of milk solids are practically wasted annually in the whey tanks of the Province. It would require 2,000 cars, holding 20 tons each, to carry these wasted food products to market.

A partial solution of this problem is furnished by the establishment in some of our best dairy centres of

Condensed Milk and Milk Powder Factories.

In a word these factories utilize *all* of the milk solids for human food. In consequence they are growing in popularity among dairy farmers. The products are marketed as plain condensed or evaporated milk, sweetened condensed milk, whole milk powder, and skim milk powder. These products are a distinct and welcome addition to the world's human food supply, and we look for a rapid development of these lines of dairying where the cow population is dense and the farmers are willing to supply an extra quality of milk as regards cleanliness and sweetness, because the finest quality of raw material is essential for condensing purposes.

In conclusion we should venture to prophesy that the future production of dairy goods will be chiefly along the lines of milk and cream for direct consumption; cream for buttermaking because of the concentrated and valuable nature of butter and also because of the great need of the by-product, skim milk, in rearing live stock of all kinds; and the production of milk for condensing purposes.

The dairy farmer who is in a position to supply milk for any one of these lines, as well as for the present cheese boom, will be assured of a good market at paying prices, if a little more attention be given to the problems of lessening the cost of production and more efficient marketing.

To get the best results at the farm end of milk production it is essential to have: good cows, each to produce from 6,000 to 10,000 lbs. of milk annually and drop a good, healthy calf sired by a pure-bred dairy bull, the heifer calves to be reared for future dairy cows; a large supply of succulent feed such as grass, silage and soiling crops; excellent and kind treatment of the cows; cleanliness of the cow, and clean, sweet milk or cream for sale or manufacture; constant watchfulness of the many details of milk production, together with co-operation between the owner and the cow in the production of the largest quantity possible of the cleanest and best milk possible for direct consumption or the manufacture of high-grade foods such as butter, cheese and condensed milk.

A Member: You think the man who runs a factory can pay high wages?

A Member: Well, his expenses are not so large in proportion to his output as the farmer's, and to that extent he can afford to pay higher wages.

A Member: Surely, in some way, by producing more feed and increasing the quality of our pasture we will be able to keep more cows than Prof. Dean stated are at present kept per acre.

A Member: We have poor pastures in Canada, not at all like those of the Old Country. The pasture seems to be nutritious till about midsummer, and after that it is generally very poor.

Prof. Dean: Dr. Zavitz has a mixture which he can give you, offhand, that will improve your pastures.

DR. ZAVITZ: I am sure those of us who have gone over the permanent pasture fields in Scotland will realize the force of what our friend has stated. I do not think we can expect to have just the same results here. One of the weakest points in Ontario agriculture is the pasture crop. We are increasing the area of our pasture lands all the time, but are not increasing the quality to the same extent. I believe we could improve our meadows very much by sowing such grasses as Orchard Grass, Meadow Fescue, Tall Oat, and Meadow Foxtail. Orchard Grass and Meadow Fescue will give a very good growth in midsummer and right into the autumn. Meadow Fescue is a little late coming on in the spring but gives a splendid pasture in the summer. I believe if some of our energetic farmers would make use of some of these grasses in their pastures they would have pasture fields more nearly approaching those in England and Scotland. Professor Dean has just referred to a pasture mixture which is more of a supplementary crop. We used to get many letters from people telling us that they were going to be deficient in pasture and feed and asking what they could sow in the spring that would provide pasture for the summer. This led to our investigating the matter and resulted in our experimenting with some seventeen annual crops, separately and in combination. We found that we obtained the best results from the use of 51 pounds of oats, 30 pounds of Early Amber sorghum, and 7 pounds of common red clover seed, making a total of 88 pounds of the mixture sown per acre. If this mixture is sown during the first week in May it is usually ready to pasture by the 20th of June. It works in well with a rotation and gives good pasture in the summer and autumn. The clover in the mixture in addition will give one or two crops of hay the next year.

A MEMBER: This subject of pasture, of course, is a very live one, but owing to lack of help it is difficult to get a mixture sown like that just mentioned. We use our alfalfa along with June grass, which usually makes a very good pasture for the summer.

DR. ZAVITZ: As a rule we do not recommend pasturing alfalfa. It is such a valuable crop when once established that it should be given every possible chance. If alfalfa is pastured there is danger of the stock eating off the crown of the plants and consequently destroying it.

A MEMBER: What time of the year would be the most dangerous to pasture alfalfa?

DR. ZAVITZ: Well, I would not recommend sowing alfalfa alone and pasturing it, but I would very strongly recommend using some other grass and putting alfalfa with it. In a permanent pasture mixture we recommend five pounds of alfalfa in addition to the other grasses.

A MEMBER: I am not afraid of any damage being done from pasturing my alfalfa as long as the ground is dry, but in the early spring when the ground is wet it is liable to be hurt by the tramping of the cattle. Along in June, when the pasture is beginning to get scarce, there is June grass, and then later, when all grasses are scarce, alfalfa provides good pasture.

DR. ZAVITZ: I think it depends a great deal on whether the alfalfa has heaved much during the winter. If it is in soil that does not heave then there is not the same danger of killing the alfalfa by pasturing.

A MEMBER: How many acres does it take to pasture one cow?

DR. ZAVITZ: It requires about three acres of pasture land to support one cow.

THE FARMER'S APPLE ORCHARD.

R. S. Duncan, B.S.A., Toronto.

It has been suggested that this subject be dealt with from the standpoint of the farmer's small apple orchard rather than the larger orchards which are used entirely for growing apples commercially. To my mind, the small orchard should receive practically the same care as the larger orchard in regard to pruning, spraying, fertilization and cultivation, and, in that event might be termed a commercial orchard though on a smaller scale.

I shall attempt to deal, therefore, in this address with the orchard as it is today rather than concern myself with the planting out of a new orchard.

Under normal conditions I venture to say that for the money invested and the labor expended there is not an acre on the average farm that will yield as handsome dividends as the well cared for apple orchard.

Let me depict the average farmer's apple orchard in the Province of Ontario at the present time. It varies in size from 25 to 200 trees covering an area of from one-half to five acres and consists of trees of practically all varieties grown for home and export use. In age, the trees may vary from ten to sixty years. In the majority of cases these orchards for some years have been sadly neglected and abandoned. They are badly in need of pruning, some trees having long, scaffold branches with no fruit borne closer to the ground than twenty feet. In many instances, the trees appear to have been butchered rather than pruned. Too many of the trees, which are covered with moss and rough, scurfy bark are never sprayed, and, as a consequence, are dying from the San José Scale and Oyster Shell Bark Louse, the fruit and tree would be affected with various diseases and injurious insects are almost sure to abound. The majority are in sod and are used as a paddock or pasture where the stock may run at will; perhaps they may receive an occasional scant dressing of manure, usually piled around the trunk of the tree, and in many cases the farmer is debating the question as to whether he had better cut the trees down for fire wood in order to utilize the land for a more paying crop. Am I too pessimistic in my picture? I do not think so.

Many of these old, neglected orchards have reached such an age and condition that it would scarcely be profitable to attempt to renovate them, and, perhaps the wisest plan in such cases would be to plant young trees. In many instances, however, these neglected orchards are quite capable of producing profitable returns if proper care is exercised to bring them back into good condition.

To prove the statement that these neglected and abandoned orchards are profitable let me in a few words give the results of two demonstration orchards which I had charge of in the counties of Northumberland and Durham in 1911, 1912 and 1913.

The orchards to which I refer were quite similar to the picture which has just been portrayed. They were totally neglected as to pruning, cultivation and fertilization and had actually never been sprayed. These orchards were taken in hand and during the three-year period were properly pruned, sprayed, cultivated, fertilized and cover crops sown. Accurate records were kept of all expenses and receipts and the following is a summarized statement of two orchards:

Orchards.	Year.	Yield in Barrels.	Selling Price.	Cost of Production per acre.	Net Profit per acre.
Durham County :—	1911	233	$475 70	$90 30	$195 12
Nathaniel Nichols, Port Hope.	1912	174	253 25	57 83	94 11
72 trees, 1⅛ acres. Clay loam soil.	1913	258	603 50	78 07	284 02
Northumberland County :—	1911	331	740 55	81 04	215 18
F. W. McConnell, Brighton.....	1912	333½	440 80	71 29	108 63
117 trees, 2½ acres. Sandy loam soil.	1913	234	493 58	69 85	127 58

This is an average profit of $191.08 for the Durham County orchard on clay loam soil and an average of $150.46 for the sandy loam soil in Northumberland County, or an average of $170.77 per year in the two orchards for a period of three years.

Numerous other cases might be cited to show how profitable the apple orchard is, suffice it to say, that under normal conditions the care of the apple orchard is worthy of our best efforts and pays and pays well.

Assuming then that the farmer intends to renovate his orchard in the spring, perhaps the first operation he should perform would be pruning. There are no hard and fast rules to be laid down as to pruning, and the operator must rely more or less on his own good judgment. There are a few general principles which the pruner must bear in mind, but each variety of tree has some general characteristics which must be considered. Speaking generally the pruner must have some ideal in mind, and prune always with that ideal in view. It is desirable, of course, to cut out all branches which interfere with each other and all weak limbs which might leave weak crotches. The top should be thinned out to permit of free air circulation and the admission of sunlight to assist in coloring the fruit.

In the old, neglected orchard the results desired cannot be accomplished in one year, for in many cases the first essential is to make the tree produce new wood growth. The rule that summer pruning tends to the formation of fruit buds and spring pruning is conducive to wood growth must be borne in mind. The first year the trees should not be pruned too severely but more of a cutting out of the dead branches and a thinning out of the top. In many cases it will be necessary to head back, or "dehorn" the trees in order to induce new wood to grow on the lower branches. Especially is this true of trees with long, bare poles or branches. This dehorning of from five to twelve feet will give the tree a more spreading effect and in a few years fruit will be borne on the lower and new shoots which are induced to grow and which can be used to almost completely transform the tree. Great care must be exercised in pruning and where large amounts of wood should be cut out it is advisable to remove only the dead wood and partially dehorn the first year and then in the second and third years complete the operation. All cuts of two inches in diameter or over should be painted with white lead and oil in order to prevent the entrance of disease producing spores.

Perhaps the trees will be moss grown and covered with old, rough, scaly bark. This should be scraped off with a hoe in the early spring in order to facilitate spraying operations.

Apple orchards are attacked by many insects and fungus diseases which are steadily on the increase. These cause an immense yearly loss in our apple crop.

The farmer must know what to spray for, in other words he must know the habits or life histories of these pests in order to know how best to combat them and attack them during the most vulnerable period of their life. He must also know when to spray and what to spray with.

Recent experiments and investigations have proved conclusively that practically all the orchard pests and fungus diseases can be controlled by proper and thorough spraying. In fact, spraying is absolutely essential to the health and vigor of the tree for protection against insects and diseases and to the production of clean fruit. Many regard the work as disagreeable and expensive, hard to understand and difficult to accomplish. A few general principles are easy to learn. It is not expensive considering results. Spraying is an insurance, an investment—spraying pays and pays well.

Proper equipment for spraying operations is necessary. For the average farmer's apple orchard of from one to four acres, a good hand pump, one capable of giving good pressure of from 150 to 200 lbs., fitted with one line of hose of from twenty feet to thirty feet in length, with two angle nozzles of the "Friend" type on a "Y" with a ten-foot bamboo spraying rod ought to do efficient work. This outfit would cost in the neighborhood of $25.00 and would pay for itself in one year. If a two-man pump is used, two lines of hose can be used to good advantage. For five acres or more a good power outfit is almost essential. In any case, the pump should be placed on a waggon or cart, not on a stoneboat, and a tower attachment should be rigged for reaching tall trees.

Briefly stated, one should spray with the wind and do as much of the tree as possible. Then spray the other side of the tree when the wind changes. Aim to cover every portion of the tree though don't waste any liquid. A good-sized tree of thirty years of age would require from three to eight gallons of spray material for each spraying.

In regard to the cost of spraying let me cite the case of the demonstration orchards to which reference has been made. Accurate figures were kept which showed that for labor and spray material the cost of spraying varied from 32½ to 55½ cents per tree for a three-year period.

Summary of Spraying Rules.

Every orchard should be sprayed as follows each season:—

1. *Just before or as the leaf buds are bursting.* Spray with lime-sulphur, commercial or home-made, diluted one to nine or ten of water. *No poison is necessary.* This application controls San José Scale, Oyster Shell Bark Louse, Blister Mite and helps to ward off cankers and apple scab.

2. *Just before or as the blossoms burst or as pink begins to show in the leaves.* Use lime-sulphur, one to thirty-five, commercial strength of Bordeaux mixture (4-4-40) and two pounds of arsenate of lead with forty gallons of mixture. This application is to destroy bud moths, feeding caterpillars, case bearers, canker worms, and helps to control apple scab and cankers.

3. *Immediately after the blossoms fall and before the calyx cup closes.* Use lime-sulphur, commercial strength, one to forty, or Bordeaux mixture (3-3-40) with two pounds of arsenate of lead per forty gallons of mixture. This controls coddling worms, plum curculio and apple scab.

In damp seasons it might be advisable to spray a fourth time two weeks later with the same mixture given for the third spraying.

Perhaps the apple orchard is the most neglected of all the crops on the farm in regard to fertilization. To maintain its fertility it should be manured each year as a plentiful supply of the elements—nitrogen, potash and phosphoric acid are necessary for a successful crop of apples.

The quantities to apply per acre will naturally vary, according to the condition of the soil. Where it is possible to obtain barnyard manure, a dressing of say five to ten tons per acre per year should give good results. The manure should not be piled up around the trunk of the trees as it tends to ferment, thus generating heat which will cause an unhealthy condition of the bark around the root collar, eventually causing collar or crown rot. Besides, the manure so piled affords a good harbour for mice. The manure should be distributed evenly over the ground as the feeding roots of the tree extend out as far as the branches. Where it is difficult to get barnyard manure, commercial fertilizers, in conjunction with a leguminous cover crop, will give splendid returns. The potash salts being almost prohibitive in price, wood ashes as a source of potash are being used to a large extent in our commercial orchards. The use of artificial fertilizers should be undertaken very cautiously. Their best results are obtained when used to supplement the farmyard manure and when used in conjunction with a leguminous cover crop and thorough cultivation.

The orchard, if neglected, is almost certain to be in sod and should be ploughed very shallow early in the spring of the year. Perhaps three inches or four inches is deep enough for a goodly number of the roots are surface feeders. The land should be thoroughly cultivated up until the middle of June or beginning of July when a cover crop of some description should be sown. Should cultivation be continued too late in the season, the trees may be kept growing too late in the fall and will thus be unable to ripen or mature their wood before winter sets in, and, as a consequence, winter injury will probably occur. A number of orchardists prefer the sod mulch system, claiming that they can get better color in their fruit. It also saves labor and expense, although they do not get as large a yield as in the cultivated orchard.

The cover crop furnishes a goodly supply of humus to the soil, assists in checking excessive or late growth, thus maturing the wood, conserves plant food, holds the snow and protects the roots from freezing. The leguminous cover crops, such as clover have the faculty of gathering nitrogen from the air and when turned under in the spring are said to be "soil improvers."

The cover crops usually sown are red clover, mammoth red clover, hairy and common vetch, rye and buckwheat. Of the leguminous crops red clover sown at the rate of twelve to fifteen pounds per acre and of the non-leguminous plants buckwheat perhaps will give as good results as any. These should be ploughed down early in the following spring.

Granted that the average farmer's apple orchard consists of a number of varieties grown for both home and foreign consumption, the picking and packing will be spread over the season from autumn until late fall.

Early apples which are intended for local and nearby markets are, perhaps, best marketed in six or eleven-quart baskets or in boxes.

In some localities practically all the fruit grown is not packed at all but simply put up in almost any receptacle and taken to market.

In the majority of cases, however, the apples are picked and carefully packed in barrels either for home or export consumption. Where farmers are perhaps

specializing in certain varieties and catering to a high-class trade, the box pack for the McIntosh Red, Snow and Spy is to be very highly recommended.

In any case the farmer should endeavor to gain the confidence of the market by putting up a strictly honest grade and pack of apples, whether in basket, box or barrel, and thus establish a reputation for himself that will be second to none.

The co-operative method of handling apples by marketing them through a Co-operative Fruit Growers' Association, is, without doubt, the most satisfactory and at the same time the most paying method in vogue to-day. We have upwards of fifty such organizations in the Province and no matter how small your orchard, if there is a Co-operative Fruit Growers' Association in your district, make it your business to become a member and join the better-farming movement.

Permit me to refer to the progress made by the members of the Durham Co-operative Fruit Growers' Association, which I had the honor to organize in 1911. I wish merely to give actual results of the business handled for a three-year period:

Season.	No. of Barrels handled.	Selling Price.	Average Price per bbl. 1's, 2's and 3's.
1911	4,337	$12,680 60	$2 92
1912	6,080	12,493 00	2 05
1913	7,816	21,810 45	2 80

This is an average price f.o.b. Port Hope to the grower, of $2.60 per barrel. Deducting an item of $1.00 per barrel for expenses of barrel, picking, packing and manager's commission and miscellaneous expenses in connection with the Association leaves an average net profit to the grower for one's, two's and three's for three years of $1.60. The average net returns to the grower would have been approximately $1 had there not been an association, and in fact, it has been about $1 to other growers not in the association. This is a net gain of 60c. per barrel to the growers in the association. Taking the total number of barrels handled during the past three years, 18,233 at 60c. per barrel means a net gain of $10,939.80 to the members.

Practically all the forty members have an orchard from one to four acres, one or two having from five to ten acres.

Now we have come to the conclusion of the first season's work in the orchard. The result, I shall venture to say, would undoubtedly be a greatly increased vigour in the trees, and the fruit, though perhaps not plentiful, would be better color and would be more free from worms and scab.

It is not to be expected that a complete transformation of the old orchard could be effected in one year. The second season the orchard should again be pruned, a dressing of manure applied, the trees kept thoroughly sprayed as outlined, the cover crop ploughed under early in the spring, and the soil kept well cultivated until the beginning of July when seed should be sown for another cover crop.

Following this procedure, we should expect the fruit to be better than the year before, but perhaps not until the third year should the trees be expected to bear heavily and the orchard be in good condition.

PROF. CROW: I listened with a great deal of pleasure to Mr. Duncan's explanation of the farmers' apple orchard problem. It is interesting to know that while we have at hand such data as Mr. Duncan presented to you, which he is able to

give you as a result of his actual work showing the possibilities of profit in an apple orchard, and while we can corroborate Mr. Duncan's statements entirely in regard to the possibilities of making money out of that line, I cannot but admit that apple orchards are, in Ontario, almost the opposite of what he pictures. It appears to me that there must be means of getting more accurate information on this subject than we at present possess. I am of the opinion that the apple orchard crop is a specialty. It is not a crop that is grown at present successfully by the general farmer. We know from actual data that the apple orchard has finer possibilities than it is realizing, but we must admit it is on the down grade. Why is it? I would like to emphasize the excellent suggestion made last evening as to the advisability of securing actual accurate data on these points from a successful survey. I know that for my own part I cannot afford to get away from the idea that the apple orchard should fit in with the farm just as the vegetable garden does. If we could obtain data by means of a survey of say duplicate counties or districts in the Province of Ontario and study in detail a large number of farms in these particular districts, we would be able to find out just why it is that the apple orchard is in its present dilapidated condition. I am one of those people who think that conditions which exist are as they are for some good reason. A survey would give us that reason accurately and completely. I must admit I cannot tell you, to-day, the best kind of farming to work in conjunction with the apple orchard in the Province of Ontario. For instance, take the County of Oxford, which is one of the best agricultural counties in the Province. In this county there are orchards all the way from five to fifteen acres, and they are rented to some other person to look after, as the people who have dairy herds have not the time to look after their apple orchards. They leave them to somebody else, and that somebody else is getting the larger slice of the profits. Is it that the apple orchard does not go well with dairy farming? In the district of Durham County nearly every orchard is of large size, ranging as high as 125 acres. Here they specialize almost entirely in apples. Late potatoes and cabbage do not go very well with apples as they require to be harvested at the same time, and consequently conflict. I submit that those at this meeting might come to the sound and earnest conclusion that we want more accurate data on this point. We hear questions discussed which we are unable to solve. If we go right to the farms of Ontario and study them we will get the information we want.

MANAGEMENT OF SOIL FERTILITY.

Henry G. Bell, B.S.A., Chicago, Ill.

It gives me great pleasure to be in Canada again and to have the opportunity to take part in the discussion of the important matters before this association. Soil fertility is of fundamental importance. As Dr. Zavitz has very kindly said, it is my duty to assist in the dissemination of information concerning the upkeep of the fertility of the soil. This duty I look upon as a great opportunity at a time when there are such enormous demands for food, coming from far and near. I need not call your attention to statistics regarding the present shortage of wheat, the poor outlook for winter wheat in some parts of the country, and the shortage of spring wheat, corn, rye, barley and potatoes. To this is added a decline in the number of livestock. I assure you that conditions are similar on the American side

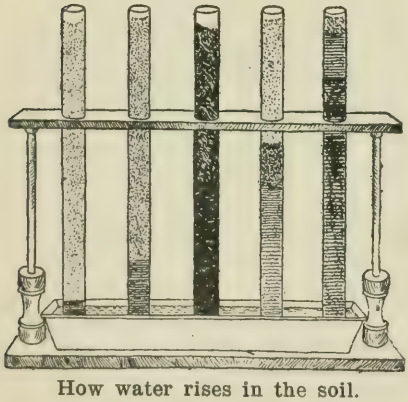
of the line. In some sections we are experiencing a greater shortage than you. Our livestock situation is becoming alarming.

I presume when you look at the apparatus before you, you are inclined to anticipate an impractical theoretic presentation of science in its relation to soil management. Let me set your minds at ease, I purpose talking in very plain language about the forces of nature that underly the productivity of the soil. The apparatus before you will be used in illustrating some of the principles discussed.

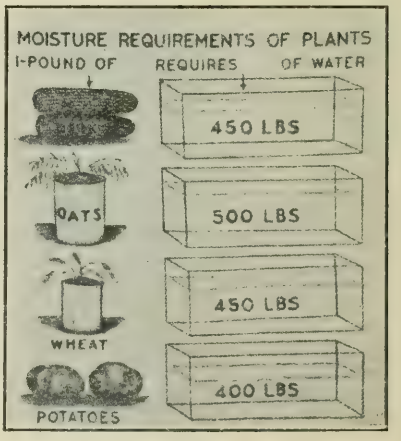
When the idea of the upkeep of fertility has entered the mind of the average farmer, he has been inclined to consider the use of livestock manure only. We have depended to a very large extent upon our livestock not only for food, but for the upkeep of the productivity of our soils. I am going to speak of stock manure and its great importance, for I look upon it as one of the great sources of plant-food as well as organic matter for the soil. I shall also speak at some length concerning the great source of fertility discussed by Dr. Zavitz; namely, commercial fertilizers.

The Home of the Plant.

The average farmer calls his soils sand, clay, loam or muck. These classes differ in a great many ways. They differ in color, chemical composition, weight, size of soil particles, etc. The difference in size of soil particles is the point of special interest to us at this time.



How water rises in the soil.



Water requirements of farm crops.

I hold a small bottle containing about an inch of colored water, and have here three glass tubes—one of fine bore, another a little larger bore, and another still coarser. When I set the tubes in the water you see that the liquid rises of its own accord to different heights in the two fine tubes. What draws it up? It is the attraction on the part of the walls of the tubes for the water. The liquid rises until the down-pull of gravity just balances the up-pull of the force that is raising the water. This force is responsible for the rise of moisture in the soil. There are spaces between the soil particles reaching from the surface of the soils down to where moisture stands. Water rises in the soil on account of the attraction between the surface of the soil particles and the moisture. The water rises through the spaces between the soil particles, just as the water rose in the bore of the fine tubes.

I speak of water first because it has such an important bearing on plantfood. Plants must have all of their plantfood dissolved in water. You see an actual illustration of the rise of soil moisture. These columns of soil rest in a pan of water. In two hours the water has risen to the heights that you see. In just the same way it is rising in the soil and will continue to rise until it comes to the surface when the water will evaporate and do no good to the crop, if nothing is done to prevent its escape. This can be prevented by early cultivation of the soil, spring ploughing, disking, harrowing, anything to break up the surface of the soil and to preserve a dust mulch, so that the moisture cannot escape in evaporation.

In this last tube is illustrated a practice against which I would warn farmers who are turning under a heavy crop of clover, or are making a heavy application of strawy manure. You notice that the water has risen in this tube until it meets the coarse material about eight inches from the top. This couple of inches of coarse material corresponds to strawy manure or to a heavy crop of organic matter turned under, and not thoroughly worked into the soil. The water cannot reach the soil above because the spaces of the coarse material are too large. When applying strawy manure or turning under green crops, be sure to work the organic matter thoroughly into the soil by disking and harrowing, otherwise there is danger of cutting off the water supply for the crops planted in just the same way that the coarse material in the tube prevented the water rising higher. I remember a few years ago, a friend of mine near Chicago said he planned to grow a very large crop of potatoes. He turned down a good growth of rye but did not work it thoroughly into the soil. The green rye which was not thoroughly worked into the soil formed a coarse padding and actually cut off the moisture supply from the area where the potatoes were planted. My friend's potatoes did not sprout and grow as rapidly as they should. He actually starved the crop by shutting off the water supply.

Moisture is of great importance. Sometimes we do not fully realize how important it is in growing our ordinary farm crops. The chart before you details averages of American and European figures relative to crop requirements of moisture. One pound of dry matter in corn, for instance, requires 400 pounds of water to germinate the corn and carry it through to the production of matured grain at harvest time. For each pound of dry matter in oats, wheat and potatoes, there is required the amount of water tabulated on the chart. This is a tremendous amount of water when we consider the average yields harvested. Much can be done to store up this large amount of water by deep fall ploughing. The deeply stirred soil forms a good reservoir to catch the moisture. By early spring working it is possible to prevent excessive loss by evaporation.

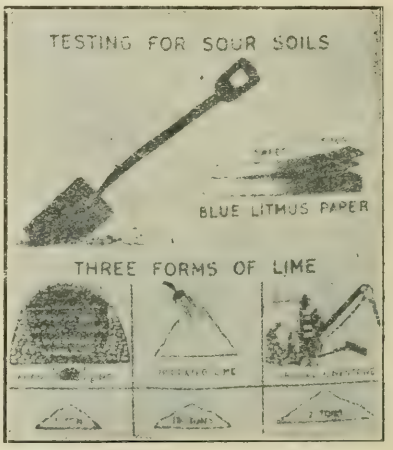
Up to this point, I have been talking of conserving the moisture of the soil. May I point out that there may be too much moisture? A good many farms in Ontario are in need of better soil drainage. Moisture which stands in the spaces between the soil kernels or particles, shuts out the circulation of air, and air is essential to the growth of the great mass of microscopic life known as bacteria which, under good conditions, thrive in the soil. These tiny forms of life are breaking down the soil so that it may dissolve and become available as plantfood They are working incessantly. Some of the tiny forms are attached to the roots of legumes—such plants as peas, beans, alfalfa and common red clover. These tiny forms of life are parasitic. They take their food from the plant, but in return have power to fix some of the nitrogen (an important constituent of plant food), which is found in the air that circulates in well-drained soils. Whether the bacterial forms are attached to plants, or exist free in decaying plant matter in the soil,

they require well-drained soil. In many sections of this good province, the farmers are in the lead with reference to land drainage. Still much remains to be done in taking care of this prime essential to the right home of the plant. Such water as can be drained off, then, is actually doing injury to the soil instead of good. The water which clings to the tiny soil particles cannot be drained off. It is this water which carries dissolved food for the crops that grow upon your land.

One of the methods of storing up more water in the soil is to add organic matter to the soil, decaying plant material. Organic matter, or humus, acts like a sponge, catching and holding the moisture which falls late in autumn, during the winter and early in spring. It is increased in the soil by the growing of legumes, by the addition of strawy manure, by the turning under of rye or buckwheat or other plant material.

I wish to illustrate another function of organic matter. Here is a funnel full of sand, and a second funnel full of muck. When I pour this red liquid on the sand

Organic matter absorbs plantfood.



How to test soils for sourness. Forms of lime.

it comes through red, but when I pour it on the muck soil it comes through almost colorless. The organic matter has absorbed the color. If the organic matter of soil has the power to absorb color, it has the power to catch and hold much soluble plantfood which otherwise would be lost out of the soil. Here, to a large extent, is the explanation of the fact, reported by Dr. Zavitz, where the effect of fertilizers, used upon potatoes, was quite evident for two and three years in the crops of barley and oats, which followed the potatoes. What the potatoes did not use was carried over for the barley. What the barley did not use was carried over for the oats. Of course the organic matter has not the power to hold all the soluble plantfood, but this important function of humus in the soil is sufficient to induce greater attention toward increasing the organic matter of the soil.

Organic matter performs other important duties. Applied to sandy soils, it binds together the loose particles, giving them body. Worked into heavy clay soils, organic matter opens up the soils and greatly improves the circulation of air therein.

Let us demonstrate that air does circulate in the soil. Let us show also how a man may injure the circulation of air in the soil, especially if the soil is of a heavy clay type and is worked too early in the spring or too soon after a heavy rainfall.

In this first funnel, again, I have a layer of sand, and in the second funnel, some wet clay. You who farm clay soils, have undoubtedly seen the shiny furrows the plow turns up when the clay is a little wet or sticky. Or, you have seen the shiny furrows turned up by the shoes of the cultivator, in cultivating your corn soon after a heavy rain. This clay, then, is in the same condition as the soil which the plough turns up in shiny furrows. When I attach the first funnel to this long bottle, and open the stop-cock at the bottom, if the air can pass through the sand the liquid will run out of the bottle and the column will fall. This, you see, is the case. When I attach the wet clay and open the stop-cock, you see that the water does not run and the column of water in the long bottle does not fall, because the air circulation is shut off. Now, to a large extent, that is what happens in your clay soils when the soils are worked while they are too wet. Of course, I do not wish to say that you shut off all the air circulation, but even if any considerable hindrance to air circulation is produced, conditions for bacterial growth in the soil are upset.

We have said that organic matter in the soil (first) has the power to catch and hold water; (second) has the power to absorb plantfood; (third) opens up heavy clay soils; and (fourth) binds together sandy soils. To these duties may be added two more very important functions. They are as follows: Organic matter forms the home and food of free soil bacteria. Now you see the vast importance of good circulation of air in the soil. The bacteria that grow on the roots of the legumes, as well as those that are free in the soil, find it impossible to do best work unless there is a sufficient supply of organic matter in the soil. The soil must be well drained so that air can circulate among its particles.

There is another condition which proves injurious to this microscopic plant life or bacteria in the soil. It is commonly known as soil sourness. This chart details specific methods of testing soil. I hold a piece of litmus paper. You see it is of purplish color. As soon as it comes in contact with anything of an acid nature, it turns immediately to a bright pink. This is the cue for the soil test. Dig a shallow hole about four to six inches deep in various parts of a field and bury a small piece of this litmus paper for about fifteen or twenty minutes. When you dig it up again, if it has turned pink, there is clear indication that the soil is sour, and is in need of lime.

It is frequently possible to recognize acid soils without testing them. Vegetation that grows on sour soils is usually clear evidence of their condition. If, for instance, you find that there is a scarcity of clover in your soil, and you see moss growing on the surface of the clay and sheep sorrel scattered through the grass or other crops, you can be pretty sure that your soil is sour. Lime is the great corrector for sourness of soil. Lime is found in several forms. It may be purchased in the form of ground limestone, air-slaked burnt lime, hydrated lime, or in the form of marl. Dr. Wheeler, formerly director of Rhode Island Experiment Station, has estimated that one ton of quick lime was equal to one and one-third tons of hydrated lime, or two tons of raw limestone in its power to correct soil acidity. The addition of air-slaked burnt lime to clay soils produces an additional effect. In these two jars I have shaken up clay soil and water. You see in the one, the water is still muddy. In the other, it is clear. I added a couple of spoonfuls of air-slaked burnt lime when shaking up the latter mixture. If you could examine the surface of the clay at the bottom of the clear jar, you would find that it is coarser than is that in the other jar. In other words, air-slaked burnt lime has the power not only to correct soil acidity, but when applied to heavy clay soil, it gathers together the particles of clay soil into coarser crumbs, and thereby assists the circulation of air in the soil.

The Food of the Plant.

So far we have been speaking about the home of the plant. Now I wish to spend a short time discussing the food of the plant. I presume you have not seen this type of corn growing in Ontario. I am not advertising it. It is but a cartoon of a growing corn plant. It is typical of how all plants grow. The lesson it is intended to convey is that the roots act in the same capacity as railroad trunk lines, bringing raw material from the soil to nature's factories, which are the leaves of the plants. This is not vain theory; it is fact. If the farmer recognizes it in its full significance, it will greatly assist him in making conditions right for plant growth. The leaves of the plant are equipped with the most wonderful machinery, just as factories are equipped with machinery. The green material in the leaves is nature's machinery. Under the action of sunlight it has the power of working over the raw material which is brought up by the roots and of re-combining it with carbon dioxide, which is taken in through the leaves, into starch, protein, fiber and other constituents.

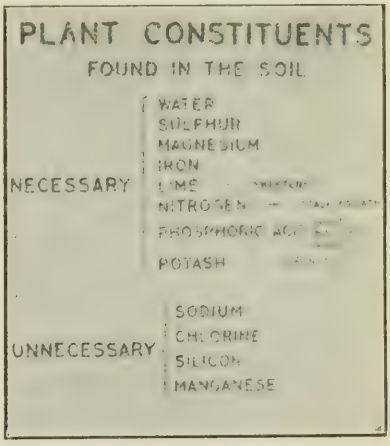
Plantfood is made up of fourteen elements. I have recorded here twelve constituents which come from the soil. Arranged in order they are: water, sulphur, magnesium, iron, lime, nitrogen, phosphoric acid and potash. These are known as the necessary constituents, and are so-called because all of them must be present in the food of the plant in order for the plant to thrive. Not one can be left out and have complete plant growth from seed germination to the bearing of fruit. To these eight constituents are added chlorine, silicon, manganese and sodium, but we need not discuss these, since frequent experiment has established the fact that they perform no essential function in the growth of the plant. There should, of course, be added to this list, carbon dioxide, which would fall in the first class, but as you see the chart tabulates only those which are taken from the soil. Carbon dioxide is taken in through the leaves. With many of these constituents you are very familiar, and yet from the very familiarity with some of them, if you have not had opportunity to study chemistry, you may have missed some very interesting facts. Water, for instance, while it is a constituent of plantfood, is not an element, but is composed of two things: first, hydrogen gas which I have in this bottle. You see it is colorless, and yet when I hold a lighted match near it, it burns very rapidly with a sort of purplish flame. Besides hydrogen, water contains oxygen, which again is a colorless gas, such as I have in this jar. Oxygen does not burn. When I lower the glowing stick into it, the stick immediately bursts into flame. Now, if two bottles of hydrogen and one of oxygen were exploded with an electric spark, there would be formed a tiny drop of water. You say, "how does this information help the practical farmer to increase his crop yield?" I cannot claim such a practical result from this experiment, but the knowledge of the composition of water itself and how growing plants can re-combine the constituents of water with other things which it takes up through its roots, opens up an entirely new world of ideas to the farmer who has been working with crops and soils all his life.

Sulphur is the next constituent. You are familiar with this interesting yellow substance. In plant life it seems to be closely related to the building up of proteins, or the material which produces flesh. Magnesium is an important constituent of the soil whose duty is not fully established as yet. It seems to have an important function in the plumping of the kernels of wheat, oats and other cereals. Lime, we have said, corrects the sourness of soil. The next constituent is iron. Few people know that the plant, during growth, requires the tiniest trace of iron. Without iron

the green material of the plant would fade, and the plant would become bleached. Now do not jump to the conclusion that every pale crop of corn, wheat or oats that you see is in need of iron, because this is not the case. Bad drainage causes crops to turn yellow, as do other bad soil conditions, but the fact remains that the tiniest trace of iron is absolutely necessary to the growth of the plant. The soil nearly always contains sufficient of this substance to supply normal needs. Each one of these constituents is essential, as discussed heretofore, but nature has so arranged the supply that little care is necessary to keep up the required amount, with the exception of lime.

Now we come to three constituents which are frequently called the essential plantfood constituents. They are no more essential than those we have discussed. However, the ease with which they are depleted by continuous cropping has made it possible in many sections for their supply to be reduced below what is necessary to grow the largest yields of best quality crops. The first of these constituents—nitrogen—I have in this jar. You see again, it is a colorless gas. It neither burns

The plant is a factory.
The roots are supply lines.



nor will it support burning. The air which we breathe is eighty per cent. nitrogen. We could not live in a pure atmosphere of nitrogen, but in the dilution with about twenty per cent. oxygen, we seem to thrive.

Here let me make an explanation that none of the constituents discussed are used by the plant in their pure forms, but are found in combination with other materials in the soil. Nitrogen is not used by the growing plant as a gas, but is used with oxygen and some other material which forms a nitrate salt in the soil, or it is combined in some soluble organic form. Nitrogen causes straw growth. It causes the corn stalk, the potato vines, the apple tree to grow. Stating it conversely, if there is a scarcity of nitrogen in the soil, the result is shown in short straw, poor tree growth, small growth of potato vines, and the like. If, on the other hand, there is too much nitrogen, there will be too great a straw growth, too much wood growth in trees, and too much growth of vine or stalk of the plant. You have frequently seen this when you plant small grain on muck soil.

The next constituent is phosphoric acid. In its pure elemental form it is called phosphorus—the yellow substance which you see burning so readily. The plant never uses pure phosphorus. Phosphoric acid in plant growth causes the

plant to ripen. Crops growing on a soil short of phosphoric acid do not ripen within the normal growing season. This is just the trouble that we are having throughout the great corn belt in the middle western states. Much of the corn is not maturing before frost because continuous growing of grain crops has greatly diminished the supply of available phosphoric acid in the soil.

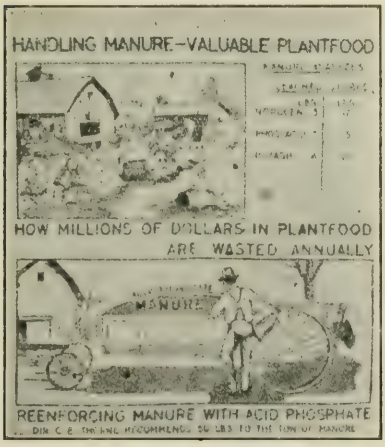
The third essential constituent is potash. It is one of great importance at the present time on account of its increasing scarcity all over the civilized world. As you know, previous to the opening of the great war, nearly all of the world's supply of potash came from Germany. Here it is found as a potash salt. Potassium is very active. A tiny particle burns very actively when I drop it on water. As already explained, this constituent, as well as others, is never used in its elemental form, but is combined with chlorine or sulphuric acid or some other material in forms which dissolve in water and can be readily taken up by the plant. What is the function of potash? This is not clearly known as yet. Potash seems to have an important bearing on the plant's power to use nitrogen. Potash also has a great deal to do with the laying down of starch within the kernel of wheat, oats or barley. It has also been found that plants growing on a soil deficient in potash do not successfully resist disease.

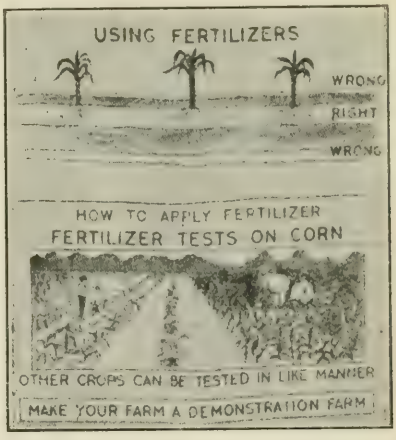
What are the chances of making good on this continent the large amount of potash that formerly was imported from Europe? There are no deposits of potash salts in America as pure as those found in Europe. Potash is found, however, combined with a sort of granite-like rock in Utah. It is also found in the sea-weeds of the Pacific and the Atlantic oceans. Moreover, lake water strong in potash has been found in small lakes in Nebraska and California. All of these sources are being developed at the present time, but the total amount of potash produced does not aggregate one-fifth of the normal demands.

All of the foregoing plantfood constituents are found in virgin soils, yet continuous cropping has been drawing upon the soil store-house to such an extent that one or more of the constituents is becoming dangerously near depletion. The late Henry Wallace, of Des Moines, used to say that the farmers of the middle and western states were soil miners, not soil builders. They have been growing crops so persistently without attention to the upkeep of soil fertility that both the yield and the quality has suffered. Some have sought a solution in rotating their crops. But there comes a time when the soil will not respond even to the best tillage and the best rotation unless some plantfood is put back. When the rotation of crops contains a legume, some of the nitrogen is put back, if the second crop of clover is ploughed under. If the second crop of clover is cut and taken from the land, very little addition of nitrogen is contributed as a result of the growing of the legume crop. For some years past I have been conducting an investigation relative to the amount of nitrogen fixed by the various legumes growing on the farm. In this investigation I have corresponded with all of the leading experiment stations on this continent, as well as with some in Europe. The consensus of opinion seems to be, as I have stated, that if the second crop of clover is ploughed under, there is an addition of nitrogen to the soil, varying inversely with the richness of the soil. On many farms buckwheat and rye and other crops are turned under as green crops. These do not make any addition of plantfood. They do add organic matter.

For more than one hundred years the farmers of this continent have been hearing about the value of barnyard manure as a carrier of plantfood, and still you can go up or down any road and find farmers who are piling the manure under the eaves of the barn where every rain washes through it and carries off soluble

plantfood in the brown stream that runs away from the manure pile. Now this brown stream carries off more than fifty per cent. of the soluble nitrogen and potash, as well as a considerable amount of the soluble phosphoric acid of the manure. Average analyses show that well-stored manure carries, to the ton, twelve pounds of nitrogen, five pounds of phosphoric acid and ten pounds of potash, but if this manure is exposed to rains and snows, over half of these constituents of plantfood is lost. For the last twenty years, Director Thorne, of Ohio Agricultural Experiment Station, has been making a study of strengthening stock manure. Dr. Zavitz knows the high type of work being conducted by Dir. Thorne, and I am sure agrees with me that the findings of this well-known investigator are entirely practical, and important to the progressive farmer. Dir. Thorne, as a result of twenty years' careful study, recommends the addition of forty to fifty pounds of acid phosphate to the ton of manure, so that the plant-ripening plantfood carried by the manure may be balanced in proportion to its nitrogen and potash. This material can either be spread on top of the load of manure or it can be distributed on the surface of the land with a lime spreader, and worked into the soil when the seed bed is being worked down.


HANDLING MANURE—VALUABLE PLANTFOOD
HOW MILLIONS OF DOLLARS IN PLANTFOOD ARE WASTED ANNUALLY
MANURE
REENFORCING MANURE WITH ACID PHOSPHATE



The right and wrong ways of applying fertilizers.

The next source of nitrogen, phosphoric acid and potash is fertilizers. While travelling up and down this continent, from the Mississippi to the Atlantic, and from Tennessee to Ontario, I find a great variation in opinion relative to what fertilizers are and what service they render. The use of fertilizers is a practice of comparatively recent date in some sections of the country, yet in others—especially in Europe—fertilizers have been used for the last one hundred years. We are hearing more about the use of fertilizers during the last year or two, because as I said at the beginning, the cry is for more food, and more food results from greater yields, and greater yields are obtained by proper soil handling, including the judicious use of fertilizers. The manufacture of fertilizers is an industry based upon definite scientific principles. An understanding of the proper use of fertilizers, while it may appear simple, is still based upon somewhat difficult physiological facts. This being the case, it is quite natural that ignorance marked the early use of this soil amendment. The beneficial use of fertilizers was discovered by an English manufacturer whose hobby was farming. This man, Sir John Bennett

Lawes, was also founder of the Rothamsted Experiment Station. In fact, his test of fertilizers formed the basis of the Rothamsted Experiment Station tests. Lawes was a pioneer in his work with prepared plant foods. He succeeded in instituting tests from which he was able to determine the effects of applying various plantfoods upon various farm crops.

On the chart before you we have tabulated the various important functions that fertilizers perform. First, they supply soluble available plantfood to the crops; second, they give the crops an early vigorous start; third, they hasten crop ripening; and fourth, if used judiciously, they increase the farmer's profit.

How is a man to know what fertilizer he should add to his soil, in order to produce the largest yields of best quality crops? This is a question which is being asked every day. Shall he have the soil analyzed? When I was in charge of the soils work at the University of Maine, I used to receive many letters accompanied by small samples of soil. They requested me to analyze the soil and to tell what fertilizers to apply in order to produce one hundred bushels of corn to the acre. The chemical analysis of the soil, of course, is a comparatively simple matter, and as far as the sample under examination goes, the analysis shows the total amount of nitrogen, phosphoric acid and potash in the soil. But the soil analysis, while to a man trained in chemistry, it is a guide, has limitations when applied to working out this question of the management of soil fertility. I know that Prof. Harcourt agrees with me when I say that a chemist can tell you what is in your soil, but cannot with assurance recommend exactly how much or what plantfood should be added. A chemical analysis does not tell you anything about the physical conditions of your soil. Dr. A. D. Hall, former director of Rothamsted station, said before the British Association in London, 1910, that he considered the size of soil particles of more importance than their actual chemical composition. He meant that the physical condition of the soil has more to do with its productivity than the potential amount of plantfood contained therein. Now, chemical analysis has a place, and that place is splendidly illustrated by the soil survey work that Prof. Harcourt is conducting throughout the Province at the present time. Representatives of the college staff are visiting various parts of the Province, taking exact samples of soil, classifying the soil on the basis of its total plantfood, and are mapping out areas of similar soil types so that the practices in one section which are found to give good results may be with certainty recommended for other sections.

We know that soils have various supplies of plantfood. The characteristic supplies of plantfood in the common soil types are as follows:—

Soils.	Nitrogen.	Phosphoric Acid.	Potash.
In sandy soil....	Poor	Poor	Poor.
In clay soil.....	Medium	Medium, but frequently unavailable.	Medium, but frequently unavailable.
In muck soil	Abundant. This nitrogen is very largely in the organic or slowly available state.	Poor	Very poor.

To this information must be added a knowledge of the characteristic plantfood needs of the crops. For instance, ordinary farm crops may be divided roughly into

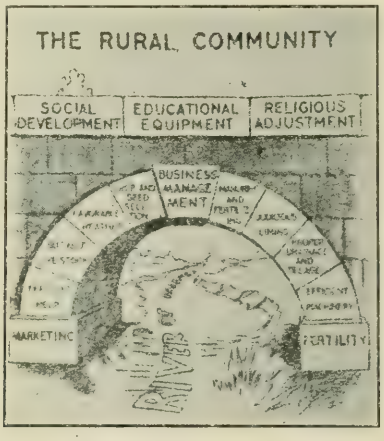
three classes, namely, hay crops, grain crops and root crops. The hay crop is cut when it has made its maximum growth. It, therefore, takes a large supply of nitrogen, a medium supply of phosphoric acid and a fair supply of potash. Grain crops, on the other hand, are harvested when the grain is ripe. Consequently, they take an abundance of phosphoric acid, and a fair supply of the other two constituents. Root crops take a good supply of nitrogen, but a large supply of potash, since they develop a relatively large per cent. of starch. Now, if the farmer has in mind the information contained in the first part of the chart, and that contained in the second part, he can intelligently establish tests both as to the quantity and quality of the fertilizers that give best results under his farm conditions.

The next question of great importance deals with the application of fertilizers. How are fertilizers best applied to our various crops? Two years ago I tried to interest the American Society of Agricultural Engineers at our various agricultural colleges in a series of tests as to how fertilizers were best applied. I regret to say that no great fund of information has resulted from this recommendation as yet. It is still an open question as to how deep fertilizers should be drilled, as to how close to the crops they should be applied and as to what quantity should be put in the row or distributed between the rows for cultivated crops, such as potatoes, corn and the like. We have made careful observation, as we have visited the farms of successful users of fertilizers, and have come to some fairly definite ideas regarding the right and wrong way of applying fertilizers. Not long ago it was my opportunity to visit an experimental field at one of the prominent middle western experiment stations. I found that in their tests they were applying the fertilizer broadcast on top of the sod and ploughing it under, probably to a depth of five to seven inches. Fertilizer users in the middle west consider an application of three hundred pounds per acre relatively heavy, and yet if you figure how much that would be per cubic foot, you will find that you could hold it in a very small bottle. Just think of fertilizers being applied at that rate per acre and buried six or eight inches deep. What possible results could a young crop have of gaining assistance when available plantfood is placed so far away from it? Other fertilizer users are scattering the fertilizer on top of poorly prepared seed beds and are not working it into the soil. Now we said sometime ago that fertilizers were carriers of available plantfood. We also said that the plant could use only such food as is dissolved in the water of the soil. If this available plantfood of fertilizers is to be dissolved in the water of the soil, it must be worked down into the damp soil. Fertilizers give their best results when drilled about the depth at which the grain is planted. This application is accomplished best through the fertilizer dropper of the grain drill. This machinery sows the fertilizer into the damp soil at about the proper depth. If, however, you do not have a grain drill with a fertilizer dropper, satisfactory applications can be made by sowing it on top of the ploughed land with the lime spreader. When the land is being disked and harrowed in the preparation of the seed bed, the plantfood will be worked into the soil at about the proper depth.

Remember that the same principle underlies the successful use of fertilizers as applies to the use of valuable farm machinery. If the machine is adapted to the crop on which it is being used, and if it is properly handled, all chances are in favor of the investment in the machine returning a profitable interest. If fertilizers are adapted in analysis to make up for the weakness of the soil, and to meet the special needs of the crop, and if they are properly applied, a paying interest on investment follows.

I have already referred to the grain drill with fertilizer dropping attachment, and to the lime spreader. To these should be added the special machinery designed for the planting of potatoes, corn and other crops. Any and all of these have been carefully constructed to take care of the dropping of the seed and of the application of fertilizers.

In the presentation of these facts concerning soil fertility and plantfood management, I have tried to develop the subject logically, emphasizing the fact that the point of first importance is the proper preparation of the plant home. When this has been taken care of, the question of the proper balance and supply of plantfood becomes of prime importance. Fertilizers will not take the place of a well-prepared seed bed, good drainage, or cultivation of crops, but if used intelligently in combination with proper soil tillage, liming where necessary, and the upkeep of organic matter, and in combination with the use of high-grade seed, fertilizers will return a big profit on investment.



Elements of farm success.

The business of farming is not simple. It is complex. My conception of it may be illustrated by the cartoon before you. On the one hand, this arch rests on the corner stone of soil fertility, while on the other it rests on the corner stone of marketing. It is useless to talk of producing larger, better crops if the subject of marketing is not given equal care. This remark, of course, applies to normal trade conditions. The keystone is business management. The other stones are: efficient help, suitable live stock, favorable weather conditions, seed selection, efficient machinery, proper drainage, good tillage, judicious liming, and proper manuring and fertilizing. All controllable factors must receive attention if best results are to be obtained. Now, the discussion of this important subject has been prolonged a little beyond the time we had determined upon. There may, however, be some question in the minds of some of the audience—questions which I may be able to answer. If so, I shall be pleased to give attention to them at this time.

A MEMBER: With regard to the supply of potash, would wood ashes be of any use, and how long would the effect remain in the soil?

MR. BELL: Wood ashes (if the ashes have been protected from the weather so that they have not been leached) supply a certain amount of potash. Coal ashes have a very small percentage of potash and a small amount of chlorine. They are, therefore, not recommended for use on soils.

A MEMBER: If you supplied potash fertilizer to a muck soil, would you get results after the first year?

MR. BELL: Yes, a muck soil is fairly well supplied with the other plant constituents, and with the addition of the potash fertilizer you ought to have results the first year, and what potash was not used by the crop would remain for use the second and third years.

A MEMBER: Is the residue from a beet sugar factory of any use as a fertilizer to supply the potash?

MR. BELL: Yes, the residue from a beet sugar factory carries a small per cent. of potash.

A MEMBER: What about the waste from a lime kiln?

MR. BELL: The waste from a lime kiln contains lime of pretty much the same composition as ground limestone; it is not generally considered to be of as high a type of lime for agricultural purposes as air-slaked burnt lime or hydrated lime.

A MEMBER: Does nitrate of soda leach out if it is left on the field?

MR. BELL: Nitrate of soda is the most soluble of the nitrogen-carrying salts. It dissolves like sugar. If your soil does not contain organic matter to hold it, it will leach out, but if your soil does contain sufficient organic matter the nitrate of soda will remain much longer in the soil.

A MEMBER: I have used nitrate of soda all my life, and I have found it to give excellent results long after it was supposed to have leached out of the ground.

CULTIVATION OF THE SOIL.

PROF. JAMES MURRAY, MACDONALD COLLEGE, QUE.

Soils and crops are so intimately associated that they are inseparable. With a wise selection of class of crops, an intelligent choice of variety and thorough seed selection, must go hand in hand with efficient soil management to secure maximum yields. The relative importance of these factors in crop production need not here be discussed—they are all of prime importance and since the question of choice of crops and selection of varieties forms the subject matter of other papers that have been contributed before this convention, attention will be confined to some of the phases of soil cultivation.

The subject before us for consideration has been of interest to mankind since our first parents began extracting a living from the soil. Since then the writers of every age have contributed to the literature on the subject. They left a record of the practices of their time and in many cases interesting theories on the various phenomena they witnessed in nature. Since the eighth century B.C. we have a more or less complete record of agricultural practices and customs in the manuscripts of the writers of the various periods. The early records are fragmentary, but of the agricultural practices of the Romans—Virgil, Cato, Columella and others—give us definite and often detailed information. Of the agricultural customs and progress of the first ten or twelve centuries of the Christian era we have little record, but since early in the sixteenth century until the present day we have fairly complete data on the practices of those who tilled the land. With the spread of education and the more general use of the printing press, books on soil management multiplied in an ever-increasing ratio until within the last fifty years unnumbered scores have appeared. Now, scarcely a month

passes that another is not added to the number. We have in addition periodical bulletins and reports from agricultural colleges and experiment stations, addresses and papers before associations such as this and numerous contributions on the subject in the current agricultural press. On a subject thus fully dealt with what is there left to say?

In the thirty minutes at our disposal we cannot hope to even touch on the whole subject of soil cultivation, and since your executive has allotted my subject without offering any suggestions as to method of treatment I have chosen for myself a phase that appears to me to be of particular interest at present, viz., the relationship of implements and power to soil cultivation.

The most important of all tillage implements is the plow. We are so accustomed to seeing plows since the time we could reach up to the handles that we are apt to regard them as common-place tools that always existed, and to think only of binders, separators or gasoline engines as machines worthy of our attention and study. But the plow has a more interesting history than even the binder which we regard as a marvel of the inventive genius of the last century. The plow in some form has been in use for almost as long a time as soil has been cultivated. In its earliest form it consisted merely of the crooked branch of a tree that was dragged by human power to scratch the surface of the soil. Even after some of the earlier improvements, which consisted of hardening the point in the fire and attaching handles to guide it, it was a rude tool, but in that form it was used for a much longer time than the modern plow has been in use.

Subsequent improvements resulted in its being furnished with a metal point and its being strengthened so that oxen might be used as the means of draft. These early plows loosened the soil only, but it soon became necessary to adapt them for the inverting of the soil to bury weeds and trash. For this the mold-board was designed. It was constructed of wood and continued through many centuries to be made of that material. Evidence that these early plows did very rude work is furnished in the advice given to the Roman farmers to plow their fields three times in preparation for a crop.

Little is known of the development of agricultural practices during the dark ages, but with a more settled civilization came notable improvements both in practice and tools. As late as the sixteenth century the plow in general use in Great Britain was a heavy, cumbersome affair requiring from four to ten horses or oxen to haul it and the attention of several men. An attempt was made to improve its efficiency by attaching several colters to cut the furrow into several slices before it was turned. This so greatly increased the draft that the multiple colter was soon abandoned.

The plow from which the modern type appears to have been developed was introduced from Holland early in the eighteenth century. Cast iron points were introduced in 1785 and they soon took the place of the old points that were fashioned by hand for each individual plow. The cast points were later edged with steel to prolong their usefulness. The first cast iron plow was made in 1807, but there was such a prejudice against them for many years that they did not come into general use until about 1820, when they were made in several parts to reduce the cost of repairing. Even the best cast iron plows were unsatisfactory in some respects—they were easily broken and scoured poorly in many soils.

The invention of the steel mold-board in 1835 was the greatest single improvement up to that time. Since then practically all the important improvements have come through a study of the construction and function of the mold-board. Until the steel mold-boards were invented plows were made to invert the soil. The

modern plow not only inverts, but more important, it pulverizes. The amount of pulverizing that a mold-board can effect depends on the nature and condition of the soil as well as on the shape of the mold-board, but a bold overhanging mold-board will do much more effective work than one which allows the furrow slice to glide off it with little twisting or bending. A pulverized furrow slice may not look as well, but in many cases it denotes better plowing as it simplifies further cultural operations.

The amount of energy required by the mold-board is, according to exhaustive experiments conducted at Cornell, only 10 per cent. of that expended in pulling the plow. Fifty-five per cent. is used up in severing the furrow slice and by the action of the land side, and 35 per cent. is required to overcome the friction due to the weight of the plow. It is poor economy therefore to use an unsuitable mold-board simply to save energy, as the more efficient the plowing the less time is required to secure proper tilth by the use of other implements.

The gang plow is of particular interest at present. Invented at the time of the American Civil War to effect a saving of labor it has, until the last few years, been used to a comparatively limited extent except in the West. Many of the early gang plows were poor substitutes for good walking plows and were more generally used to take the place of cultivators. The modern gang plow with sufficient power and in the hands of a good plowman will do work that is 100 per cent. efficient. In small fields and on stony land the gang plow has no place, but on many farms a real saving of labor could be effected by its use.

Next to the plow as a tillage implement comes in general utility the harrow. Of almost as great antiquity the harrow has remained until the present day a comparatively simple tool. Its earliest form, the brush harrow, is still used on occasion and serves a useful purpose, whereas the earliest plows have long since disappeared. The Romans used a wooden framed spike tooth harrow two thousand years ago and hauled it over the land with an ox. We still find practically the same harrow in parts of Europe, and even in Canada. In some parts of Quebec the harrows in general use are no more than six feet to eight feet wide, and it is no uncommon sight to see a man driving one horse on a tool of this kind. I expect similar outfits could be found in Ontario, with the owners complaining at the same time about the scarcity of labor. Whether or not such extreme cases are common it is a fact that the ordinary harrow in use might to advantage be greatly increased in size. A man can just as easily drive four horses as two, and by so doing harrow a strip twenty feet wide instead of ten. He would besides be doing better work as a wide harrow pulls steadier and pulverizes better than a narrow one.

I shall not attempt to describe the numerous types of cultivators that have been used from time to time nor even to mention those now available to the buyer. Machines of various types have been introduced to displace the plow, but so far none of them have been successful. When to use the plow and when a cultivator is a question which must be decided by every man for himself. Years ago the tendency was to plow more frequently than was necessary, and to confine the operations of cultivation mainly to plowing and harrowing. Now the pendulum seems to have swung the other way and the cultivator, the disc or the double cut-away is frequently expected to do its own work and that of the plow as well. This may save labor for the moment but in the long run it is poor economy. When the land is in poor physical condition and a good seed bed cannot be obtained through surface cultivation the land should be plowed in spite of the additional expense, but if a good seed bed can be prepared by means of surface cultivators plowing is unnecessary.

Cultivators of the larger sizes should be used for the same reasons that apply to harrows. The work is better and more cheaply done. In this connection it is interesting to note some figures published a few years ago by Director Grisdale of the Experimental Farms as to the relative cost of doing work with machines of different sizes.

PREPARING LAND WITH DISC HARROW.

Discing one acre with small disc (three cuts necessary)	$0 90
Discing one acre with large disc (two cuts necessary)	80
Discing one acre with cutaway (one cut necessary)	45

CULTIVATING ROOTS.

Once over with single cultivator	62
Once over with double cultivator	45

PLOWING.

Plowing one acre with single plow	2 00
Plowing one acre with two-furrow gang	1 25

COST OF SEEDING.

Seeding one acre, two-horse seeder cost	22½
Seeding one acre, three-horse seeder cost	18

These figures speak for themselves and clearly show the saving in using the larger units. In large fields the big implements can be used to better advantage, but even in fields of 8 or 10 acres a four-horse team can be used just as conveniently as one or two horses. If the more general use of large cultivating machinery resulted in the 5-acre fields being done away with and fields of 10-20 or 25 acres arranged, so much the better. There would be less fence to keep up, fewer fence rows to keep clean and an increase in cultivated land of several acres on each farm —a distinct gain in every respect.

To utilize implements to the best advantage we must have efficient power. Man power for the major farm operations such as plowing, harrowing, sowing and harvesting was long ago abandoned, and so scarce has labor become that for planting, hoeing, stooking and similar farm operations it has, through the invention of machinery and the adapting of cultural methods, been reduced almost to a minimum. Potatoes are now planted and dug by machinery, a transplanting machine largely takes the place of hand labor in setting tobacco and cabbage plants, roots are partially thinned by the use of the harrow, corn is planted in check rows to eliminate hoeing, and the sheaf carrier on the binder all but stooks the grain. Machines do many other things on the farm just as wonderful, but in spite of these changes toward eliminating manual labor on the farm we have to-day a greater scarcity of farm labor than ever before. This condition is accentuated by the absence of so many farm boys who have beat their plowshares into swords and are now engaged in work even more important than plowing.

To relieve the shortage of labor the use of larger machinery will do something. Gang plows, wide harrows, two-row cultivators, and other large implements should be used to a greater extent than they are. But the question may reasonably be asked, what can we expect in the way of more efficient power? Can mechanical power be used to advantage by Ontario farmers for plowing, harrowing, sowing and other field operations?

Mechanical power for soil cultivation has been in use for over half a century. Steam engines were used for plowing in England in 1857. There until com-

paratively recently the double engine system has been most largely employed. With this system the engines do not travel over the land but one is placed at either end of a field and the plows are pulled backwards and forwards by means of a cable. The outfit is expensive, costing nearly $20,000 in this country. This system is used on continental Europe as well as in Great Britain, also in South Africa and California. There is only one working in Canada, but it has given very good satisfaction. Where very deep plowing is required and where the land is free from stone the double engine system has some decided advantages, but the initial cost is so high that they are for ordinary purposes ruled out of consideration. Within recent years the small tractor pulling from two to six plows has been coming into more general use in many European countries. They are frequently owned outright by landowners, but often they are in the hands of associations of farmers organized for the purpose of buying them. They do whatever plowing is required on the farms of the association members and as much custom work as time will permit. Their use in Europe has increased to such an extent that one would judge that in European agriculture they have won a permanent place.

In Canada few tractors were used for farming purposes until about ten years ago, and up to the present their use has been mainly in the prairie provinces. Eastern Canada has been invaded by tractor salesmen only during the past year or two. A few farmers in Ontario and Quebec have bought outfits and are finding out for themselves how useful they are under eastern conditions. Others are holding back hoping to profit by the experience of their neighbors and ready to buy as soon as they are convinced that the tractor will be of real service to them.

In the West many thousands of tractors have been sold within the last decade. Among the army of purchasers may be found those in whose hands they have given supreme satisfaction and others who cannot find words strong enough adequately to condemn them. The difference in experience is due sometimes to the land on which they were used, more frequently to the make of engine, but very often to the men who owned or operated them. It is impossible briefly to summarize the experience of western tractor owners, the conditions under which they worked were too divergent.

Even if it were possible to summarize western experience it would not strictly apply here where farms are smaller and the class of farming different, but at the same time there are some factors which are the same, namely, the machine and the operator. After all these are the most important.

As one who has had some experience with traction engines in the West I want to bring to your attention some facts and figures on the cost and efficiency of their work, and some observations on their utility.

During the four years 1911-14 over 50,000 acres were plowed by traction engine on the farm for which I have figures. The number of engines varied from year to year, the maximum number being five steam and five gasoline used in 1912. The steam engines handled ten 14-inch plows, and the gasoline engines eight plows. Each engine pulled besides either a packer or a set of harrows. The tractors were used for little other than ploughing, as that is the work for which they are best adapted. Horses and mules were used to keep the other work in hand.

Good engineers were employed and a head engineer was responsible for the upkeep of all the engines. Repairing was done in a machine shop on the place and every engine was thoroughly overhauled during the winter.

Accurate cost accounts were kept of fuel, labor, repair parts, time spent in repairing, oil and the cost of overhauling. A record was also kept of the work done. The figures that I have available cover the season of 1913 for five steam

and two gasoline engines. The steam engines had worked for two full seasons before and the gasoline engines for one year only. The work at which they were engaged was mainly plowing summer fallow, although some of the earliest plowed land was put into crop. The land varied from a light loam to a fairly heavy clay and was plowed from six to seven inches deep.

During the season the steam engines averaged 88 days' work each. Some figures as to cost of operation are as follows:

Cost of coal at plow, $6.25 per ton.
Area plowed in season, 6,110 acres.
Area plowed per day per engine, 18 acres.
Coal used per acre, 186 lbs.
Cost of coal per acre, 58c.
Average cost of engine crew per day (wages and board), $14.20.

Total cost of upkeep of engines per year, including repair parts, repairing, oil and grease, overhauling, etc.	$5,374 50
Average cost of upkeep for one day's work	12 20
Cost of one day's plowing	39 05
Cost of plowing one acre	2 17

The gasoline engines worked a longer season than the steam engines, averaging 159 days plowing each. Gasoline was high, costing 35c. per gallon.

Acreage plowed, 3,480.
Acreage plowed per day, per engine, 12.5.
Amount of gasoline used per acre, 3 gallons.
Average cost of engine crew per day, $9.20.

Total cost of upkeep of engines for year, including oil, repairs, repairing and overhauling	$1,687 00
Average cost of upkeep for one day's work	5 30
Cost of one day's plowing	29 70
Cost of one acre's plowing	2 37

The conditions under which the engines worked were not ideal. They were not new—the steamers had put in two seasons' hard work; the land had all been plowed before so that the footing was not perfect and moreover, the engines were all operated by hired labor.

Some of these figures require special mention. The cost of coal for the steam engines, while not excessive, is as high as it is on account of the long haul from the cars to the plows. This cost $1.55 per ton. The charge for gasoline fuel is very high, $1.05 per acre, and probably more than would be the case ordinarily in eastern Canada. The amount of gasoline used per acre may also appear high, but it must be borne in mind that the plowing was from 6 to 7 inches deep, and as the work was continued throughout the whole summer the land was frequently too dry to plow to best advantage.

The cost of upkeep is even more striking. As already mentioned this includes cost of oils and grease, repair parts and repairing, overhauling during the winter and the wages and board of the supervising engineer. For each day's work done the upkeep cost of the steam engines is $12.20 and for each gasoline engine $5.30. This great difference is partly due to the fact that while the steamers plowed only 88 days on an average, the gasoline outfits plowed 159 days. Had the steamers done a longer season's work the daily charge would have been less.

Where only one engine is operated it is customary to charge against upkeep only the bare cost of repair parts—the time spent in removing the broken parts and in fitting the new ones is overlooked. Odd days spent at repairing is seldom charged for by a man operating one engine only. In the figures here given all upkeep expenses are included. The total is of no mean proportions.

Still another important item to be considered is depreciation. There is a wide divergence of experience and opinion as to the life of traction engines. Many do not last longer than four or five seasons while others continue to be useful three or four years longer. The term of life depends not only on the construction of the engine and the work that it does, but also on the care it receives. Accurate data is not available; any figures that may be quoted are the opinions of those who have used tractors for a few years. The United States Department of Agriculture in Bulletin No. 719, issued last May, gives some figures that are probably as reliable as any.

The estimated average life of tractors in days of service is given as follows:

Size of Tractor.	Average Life in Days' work.
2 plow.	294
3 plow.	392
4 plow.	510
5 plow.	585
6 plow.	735

A steam engine of the size used—30 h.p. with a ten-furrow plow costs approximately $5,000.00. If the life of the engine be assumed to be 735 days as given above the depreciation per day would be $6.80 or 37 cents for each acre plowed. The actual cost of plowing would, therefore, be $2.54 per acre.

A gasoline engine rated at 30-60 h.p. with an eight-bottom plow costs about $4,200.00. The depreciation to be allowed in this case would, therefore, be $5.71 for each day's work or 45c. per acre. Adding this to the other costs we have a total of $2.82 for one acre's plowing.

These figures may appear to many to be too high fairly to represent the cost of plowing by mechanical power. I will admit that engine plowing has been done cheaper not only in Western Canada but in the east as well, but for every acre more cheaply plowed I am confident there are three acres that have cost more. I believe the figures here given are not extreme but present fairly accurately the actual cost of engine plowing under the conditions above outlined.

Unfortunately I have not available the figures giving the cost of plowing with horses or mules. The amount of work done on the average farm by a horse or mule is about 100 days per year. The number of days' work done by a horse has a direct bearing on the cost of each day's work, as food is consumed on idle days as well as on those spent in harness. Just what horse plowing does cost may be fairly accurately reckoned. It is necessary only to consider the average number of days' work performed by each horse, the cost of feed and care for a year, the cost of manual labor and the acreage plowed per day. It is rare indeed to find plowing by horses more expensive than that done by tractors when all the expense of the latter is taken into consideration.

The advantage of the tractor lies not in the cheapness of the power but in its ability to do heavy work and do it rapidly. There is not the same tendency to plow shallow with a tractor when the weather is hot or the ground hard that there is with horses. Where a large amount of land has to be plowed the tractor can accomplish the work in the right season, whereas with horses either too many must be kept for other seasons or the work is spread out over too long a period.

The quality of work done by a tractor depends upon the operator and the adjustment of the plows. Properly handled a tractor will do just as good plowing as can be done by horses, providing horses are used for striking out and finishing up lands, but for other kinds of work the tractor is at a great disadvantage. There

is altogether too much power lost on account of poor footing. To be employed satisfactorily fields of reasonable size are necessary. In small fields too much time is spent in turning and too high a proportion of the field has to be finished up with horses.

It is no easy matter to operate a tractor satisfactorily with hired help. When the operator is hired it is important that the owner of the outfit understand its operation in order that it be not abused.

The amount of labor that can be saved depends upon the size of the tractor. With the larger sizes that pull six, eight or ten plows the saving is considerable; with a two-plow size there is no saving, as a man can plow just as much with a four-horse team and a gang plow as he will with a two-plow tractor. It would seem that a tractor should pull at least four plows to warrant its purchase on account of saving labor.

Great improvements in the tractor have been made within the past five years. They are simpler in construction and more efficient in operation. Manufacturers are awake to the necessity of still further perfecting them and we may expect to see greater improvement within the next few years. They are now working under a greater variety of conditions than ever before and their defects will be the more quickly brought to light and corrected. We may confidently expect the tractor to occupy, in the not distant future, a more important place as a farm power than it does at present.

Mr. Monteith: We have heard a most interesting address from our friend Prof. Murray. He has gone over the wide field of cultivation and has emphasized certain things that enter into the cultivation of the soil. What impressed me most when he was finishing, as naturally the last impressions are the strongest, was this: That the most important element in cultivation after all is the man behind the plow, with the judgment necessary for exercising the principles of cultivation. Part of his paper dealt with a comparison of methods, gasoline or steam *versus* horse flesh. Now what we are here for this afternoon is to peep into the future and see what is best to apply to the conditions as we meet them. It will be some time yet before horse flesh is eliminated from the farms of Ontario. We have been breeding and growing stock for Canada in a very large way, particularly horses, and it appears to me, in discussing this matter of cultivation, that we must approach it chiefly from the horse-power viewpoint. Much of the best results from cultivation are lost from lack of judgment as to the time to cultivate. Last spring was a splendid example of loss of opportunity from not being able and ready to take advantage of the season when that opportunity presented itself. The time and money that would be necessary to overhaul our implements is often spent on something of no advantage to us whatever. I would like to mention a fact that is too often overlooked, and that is, our implements should be ready so that when the fields present an opportunity for us to go out and do business we should be prepared. Overhaul your implements during the winter when time is at your disposal, and see that everything is ready. I have known men who would lose two or three days getting ready to go out on the land at the most precious time of the season. The men who put their crops in early last season were the men who had a fairly bountiful crop; in fact, they were the only men who had. Cultivation is something, which I said at the outset, is dependent on the individual. Do it at the right time in the proper way. That was what we aimed at in my day when we had nothing like the opportunity that you have at the present time. You have the advantage of all kinds of machinery and of knowing how to handle it. I have had the opinion of experienced men in dealing with farm labor, with machinery and every operation

on the farm, and they have told me that the farmer himself, in order to manage the situation, should have a working knowledge of every implement that comes into the operation of farming. That is in accord with what we have been discussing this afternoon. Those of you in attendance at this College should take every opportunity of getting a good working knowledge of the different farm implements, not all perhaps, but those that are likely to be at your disposal in the future. A great number of us have learned the principles and application of steam and gasoline. All these things have come to be factors in the line of production on our farms, and we have become acquainted with them very often at a loss. Good cultivation is essential to the success of farming. During the past season we had a good crop of corn, mangels, and a reasonably good crop of potatoes, and it was through the agency of cultivation that we overcame, to a very large extent, the extraordinary conditions of drought during the past season.

Mr. McKenney: With me it is not so much a question of knowing how to cultivate as it is a question of being able to cultivate at all. The labor problem is one of the most serious defects with which we have to contend. You cannot cultivate a 100 or 200 acre farm by yourself, as that area cannot be kept in a state of high cultivation. There is one thing I would like to impress upon the young men here, and that is the amount of labor saving machinery it is possible to use at the present time. I can remember when my brother used the first wide furrow plough in our locality. It was a plough with a 14-inch pitch, and turned a furrow of 16 inches. The farmers in our district, many of whom were French-Canadians, were following in the footsteps of their ancestors and were using the narrowest plough they could possibly get. They said the wide furrow plough was a lazy one, being too heavy, and it did not set the furrow slice up properly, nor did it turn the furrow right. I have been using the wide furrow plough for a number of years with increasing satisfaction each season. A great deal can be said of the advantages of this plough. It only turns one furrow and requires three horses, but it breaks up the soil and makes it much easier to cultivate when the ploughing is done. In the matter of wider harrows and wider disc harrows, the double action disc harrow is a machine which I think has a place on every farm. It certainly is a wonderful improvement over the old two horse single action disc harrow. I use several of these with four horses to each. If the ground is in good condition in the spring when the land is ploughed once over the double action disc harrow will put the land in splendid shape for the drill. I have had some experience with motor power on the farm as compared with horses. I have always used the largest machines I could get and have sought to eliminate as many hired men as possible. The tractor that will only pull two ploughs so slowly that two horses could equal them is not of as much use on the farm as two horses, and the upkeep of the tractor would be much greater than for the two horses. Another trouble with the tractor is that you have to keep an expert mechanic or be one yourself. You cannot hire very many expert mechanics at the present time. This last factor has to be considered before any very large investment is made in tractors.

FERTILIZERS AND THEIR USE.

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In the discussion of the question of soil fertility I tried to point out that the productive power of the soil depended upon the supply of moisture at the disposal of the plant, thoroughness with which the soil was drained, freedom of air circulation within the soil, presence of sufficient organic matter, and the sweetness of the soil reaction. I also emphasized the relative influence of the suitability of the variety of crop, purity of seed, care with which the crop had been planted and tilled, and the supply and balance of the essential plantfood constituents which are at its disposal. It is our purpose now to turn our attention to the question of plantfood and its use—especially that type of plantfood known as fertilizers, or commercial fertilizers, or artificial fertilizers. The multiplicity of names indicates to some extent the chaotic nature of current knowledge concerning fertilizers and their use.

Fertilizers are carriers of available plantfood. They supply exactly the same constituents of plantfood—nitrogen, the plant grower; phosphoric acid, the plant ripener; and potash, the kernel filler and stalk strengthener—as are carried by manure. They may vary in analysis since in the manufacture of fertilizers, the brand or type of fertilizer is produced of an analysis determined by the chemist and under his direction.

The production of fertilizers has been a process of evolution. Necessity is the mother of invention. With the rapid growth of population in European countries necessity required that more food should be produced per acre, if the living needs of the population were to be met. For instance, in 1800 Great Britain is reported to have produced an average of about 15 bushels per acre of wheat. In 1915 her average was over 32 bushels. In 1800 France produced about 11 bushels per acre, while in 1915 her average was nearly 20 bushels per acre.

Among the epoch-making inventions of the last few centuries, one of the greatest and farthest-reaching has been the discovery and development of the manufacture of available plantfood or fertilizer. Modern fertilizer manufacture had its inception in the work of three men, Von Liebig of Germany, and Lawes and Gilbert of England. These men, in studying how a failing supply of food could be replenished, discovered that better crops grew where bone had been buried than where no addition had been made to the soil. They also discovered that ground bone seemed to be more quickly used by the plant than the bones in their raw state. They further discovered that if to ground bone a certain amount of acid were added, the bone would break down into such form that the resulting material would dissolve in water and could become immediately available as plantfood. This discovery marked the first manufacture of acid phosphate or super-phosphate.

Sir John Bennett Lawes, the founder of the Rothamsted Station, in 1842, took out the first patent for the manufacture of acid phosphate, and founded the renowned Lawes Fertilizer Company of London, England. Lawes associated with himself a young chemist named Gilbert. These two manufacturers being of a scientific turn of mind, established a test farm, which has been operated for more than 60 years. So carefully and accurately were all the details of the tests of the various plantfoods in connection with various farm crops carried out, that on the death of these two experimenters in 1890 and 1891 the British Government took over the management of the Rothamsted estate and maintained it on much the same basis as Dominion experiment stations are maintained.

This morning we demonstrated that all plantfoods in order to enter the plants must be capable of dissolving in water. This was first enunciated by DeSaussure.

We have already discussed the functions of the various plantfood constituents and the supply of the essential plantfood constituents in the soil.

The earliest form of soluble plantfood in fertilizers was dissolved bone, as already pointed out. Bone meal carries from 3 to 5 per cent. ammonia, as well as 18 to 25 per cent. phosphoric acid. There are two kinds of bone, namely, raw bone meal and steamed bone meal. The former contains a higher per cent. of ammonia and a lower per cent. of phosphoric acid than the latter. We have already pointed out that bone meal hastens the ripening of crops. However, there was not enough bone to supply the demand for this form of plantfood. The fertilizer industry consequently had to turn to the phosphate rock deposits of the southern part of the United States. Similar deposits are found in some parts of Ontario. In the south phosphate rock occurs in two forms, first, in layers somewhat the same as limestone in quarries, and, second, in the form of pebbles in the beds of extinct rivers. The fertilizer industry gathers the rock from either source, washes and drys it and grinds it by means of powerful grinding machinery into a fine, flour-like powder. The standard is 100 per cent. to pass through an 80-mesh screen. The fertilizer industry now has to turn to a great sister industry to obtain a special substance to break down the relatively insoluble phosphate rock. The industry obtains sulphuric acid and in the manufacture of acid phosphate adds just sufficient sulphuric acid to change the three-lime, or insoluble form of phosphate rock to the one and two-lime forms, or the forms in which the material will dissolve. (These are the forms of the substance when it is called super-phosphate or acid phosphate.) The finely ground rock and the acid are mixed into a sort of a mud-like consistency and are dumped into a den where chemical changes take place. The den is opened at the end of 12 to 20 hours and the material can be readily removed.

Sir John Bennett Lawes, the first fertilizer manufacturer, found that the plant needed more than phosphoric acid, the plant ripener. The crops made more thrifty growth when nitrogen was added to phosphoric acid. Tankage, or the material which comes from the slaughter-house, blood, and other waste portions of the animal body, contain a varying amount of nitrogen. It is prepared by cooking, dressing and drying into such forms as can be used in connection with the plant ripener to supply that constituent of plantfood, nitrogen, or ammonia, which has to do largely with the rapidity of the stalk growth. The fertilizer industry is one of the greatest agencies of conservation at work in the world to-day. It makes use of by-products which were formerly cast into lake and river and lost forever. It gathers waste products of the mine and the factory, and is actually tapping the air in order to obtain material which can be used in the production of crops.

There was not enough blood and tankage to supply the great demand for nitrogen, hence the industry had to turn to the soluble salt known as nitrate of soda which is obtained from South America. This salt contains about 15 per cent. pure nitrogen. Still further, the industry turned to the by-products of the coking industry. Underneath a large portion of this North American continent there lie great deposits of coal. This coal contains considerable ammonia which makes it impossible to use the coal in its raw state in the smelting of iron ore. As a consequence, the coal is coked; that is, it is baked in ovens until the ammonia is driven off and the remaining carbonaceous substance retains the power to produce heat, and burns readily. In the gas which is driven off there is a considerable percentage of ammonia, or nitrogenous plantfood. Later inventions have made it possible to gather this escaping gas in the form of sulphate of ammonia, a valuable nitrogenous plantfood carrier.

Since the beginning of the terrible European conflict we have been hearing a great deal about synthetic ammoniates. This means carriers of ammonia produced by a manufacturing process, which causes the building up of the ammonia carrier instead of the elaboration of it from other substances. Near at hand you have the great water-falls of Niagara. Some years ago a company took advantage of this great power plant to locate a process for the manufacture of calcium-carbide, or a combination of calcium and carbon. In this manufacture it is found that by a further manufacturing process it is possible to combine calcium and carbon and nitrogen. The air that you breathe contains about 80 per cent. of nitrogen. The new material is known as calcium-cyanamid, or cyanamid. It is a greyish granular powder and contains a considerable per cent. of ammonia or nitrogen. This manufacturing process makes the future look hopeful, for while the limestone holds out and the carbon-dioxide found in the air, as well as nitrogen, and while powerful water-falls remain to be harnessed, a supply of nitrogen is assured.

In the southern states considerable quantities of the refuse of cotton seed is used as a carrier of nitrogen. You live stock producers know full well that you sometimes purchase this material as a carrier of protein for your live stock rations.

Now, to the plant grower and plant ripener there must be added the stalk strengthener and the kernel filler. Previous to the outbreak of hostilities the world's supply of potash came very largely from the Strassfurt mines, but since this supply has been cut off various continental sources have been studied. One of the most promising sources is the great bed of sea-weeds on the Pacific and on the Atlantic. These sea-plants contain, beside other things, a considerable per cent. of potash. When the plants are dried and ground they become a source of this important constituent of plantfood. Besides kelp there is a rock found in the Rocky Mountains known as alunite. This rock is intensely hard and must be subjected to great heat and crushing in order for it to liberate its potash in such forms that the material can be dissolved and recrystallized.

In the dearth of potash it behooves every one of you to take the greatest care of any substance which carries this important plantfood constituent. For instance, if you are burning wood the ashes which are daily taken from your stove carry a considerable amount of valuable potash. Great care should be taken not to allow the ashes to be exposed to rain, for if such exposure is allowed the potash will quickly dissolve and be leached away. Similarly, leaves and straw should be carefully conserved and returned to the land if the potash of the soil is to be conserved as much as possible. Of course, manure, which contains from 10 to 12 pounds of potash per ton should be carefully stored as we have described and handled judiciously.

We have discussed the assembly of the three essential constituents of plantfood—nitrogen, phosphoric acid and potash—from various sources and from various parts of the world. The fertilizer industry is, therefore, one of the great assembling institutions of modern commerce. It gathers the product of the mine and the factory, the product of the sea and the air, and by processes of manufacture, as just described, reduces them to forms that can be returned to the farm, the form of plantfood which supplies the plant with readily available stalk grower, plant ripener, stalk strengthener and kernel filler.

In a modern fertilizer plant much attention is given to labor-saving machinery and to machinery that is efficient in combining the materials described above. The manufacture of the different brands of fertilizers, or fertilizers of different analyses, is carried on under the supervision and direction of an expert chemist. He it is who knows from actual tests the plantfood carried by the various plantfood carriers

that he is making use of, and it is the chemist who gives the exact instruction as to how much of the various constituents to use in order to obtain an analysis of fertilizer on which he has determined. When the material has been thoroughly combined it stands for some time before it is shipped to the farmer. When the shipping season arrives all cured goods of various analyses are conveyed back to the grinders and sifters where they are thoroughly re-ground, re-sifted and then bagged for shipment. The curing and double-mixing processes insure drillable goods, which is so evenly mixed that each hill of corn gets the proper proportion of nitrogen, phosphoric acid and potash which is supplied in the plantfood under question.

If the plantfood, carefully prepared, is chosen of an analysis suited to the soil and to the crop, and is thoroughly and carefully applied, it cannot fail to have a very marked effect upon the yield and the quality of the crop produced.

Rothamsted Experiment Station, which is the oldest existing experiment station, has made long careful tests in studying soil fertility and fertilizers, some of their experiments having been running nearly seventy years. Their reports show that on wheat plots receiving complete fertilizer, they obtained an average yield of 31.2 bushels of wheat per acre for 51 years, against an average of 13.1 bushels per acre on soil which was not fertilized.

Pennsylvania Station, as a result of 30 years' continuous culture, secured an average of 23.7 bushels of wheat per acre with fertilizers, against 13.6 bushels where no fertilizer was used.

Ohio Experiment Station, in an eighteen year test, averaged 24.7 bushels of wheat per acre where they used suitable complete fertilizer, against 10.7 bushels per acre where they did not use soluble plantfood.

As a result of an eight-year test, Indiana Experiment Station secured an average yield from fertilizers of 21.7 bushels per acre, against 13.2 bushels for unfertilized wheat.

A prominent Wisconsin potato grower decided to break up a virgin soil in the northern part of the state. He decided further to make a trial of fertilizers on this soil. At harvest time he obtained 390 bushels per acre where he did not use fertilizer against 470 bushels per acre where the plantfood of the soil was balanced by the addition of about 300 lbs. per acre of fertilizer.

Illustrations are numerous where an addition of 300 to 500 lbs. of suitable fertilizer per acre have increased wheat yields from less than 30 bushels per acre to over 41 and 42 bushels per acre.

The effects are not only found upon the crop to which the plantfood has been added. You have had a splendid instance of this in Dr. Zavitz' report of the hold-over effect of fertilizers where they were applied to potatoes, wheat and grass crops as previously stated. The addition of soluble plantfood to wheat when seeding down to timothy and clover or alfalfa almost insures a catch of these crops and gives the tiny plants additional vigor to meet the severe tests of the coming fall and winter.

We have sought to outline the preparation of plantfood other than that which is produced on the farm. Plantfood which can give strength and vigor to growing crops, and plantfood which if used intelligently cannot fail to give profit to the farmer. Fertilizers, like farm machinery, must be correctly used in order to obtain maximum profits. They should in all cases be suited in analysis to make up for the deficiencies of the soil, and to meet the special needs of the crop. The fertilizer industry is an economic necessity to the survival of American agriculture. It reaches out through all parts of the world to obtain carriers of plantfood, which

it can combine with the waste products of our factories at home and with carriers of plantfood from our domestic resources.

The use of fertilizers is not a new and untried practice. It was established early in the nineteenth century, and has made European crop production almost double what is normally harvested on this continent. Its use and the great service it can render make it of especial interest to Ontario and to Canada at this time. Largest crops of best quality can be obtained if the home of the plant is properly cared for, and if the meals on which the plant is to live are both abundant and well balanced.

ANNUAL REPORT

OF THE

ONTARIO
Corn Growers' Association

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1917

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Cor. Queen & John Sts.
Toronto.

To His Honour Sir John Strathearn Hendrie, C.V.O.., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

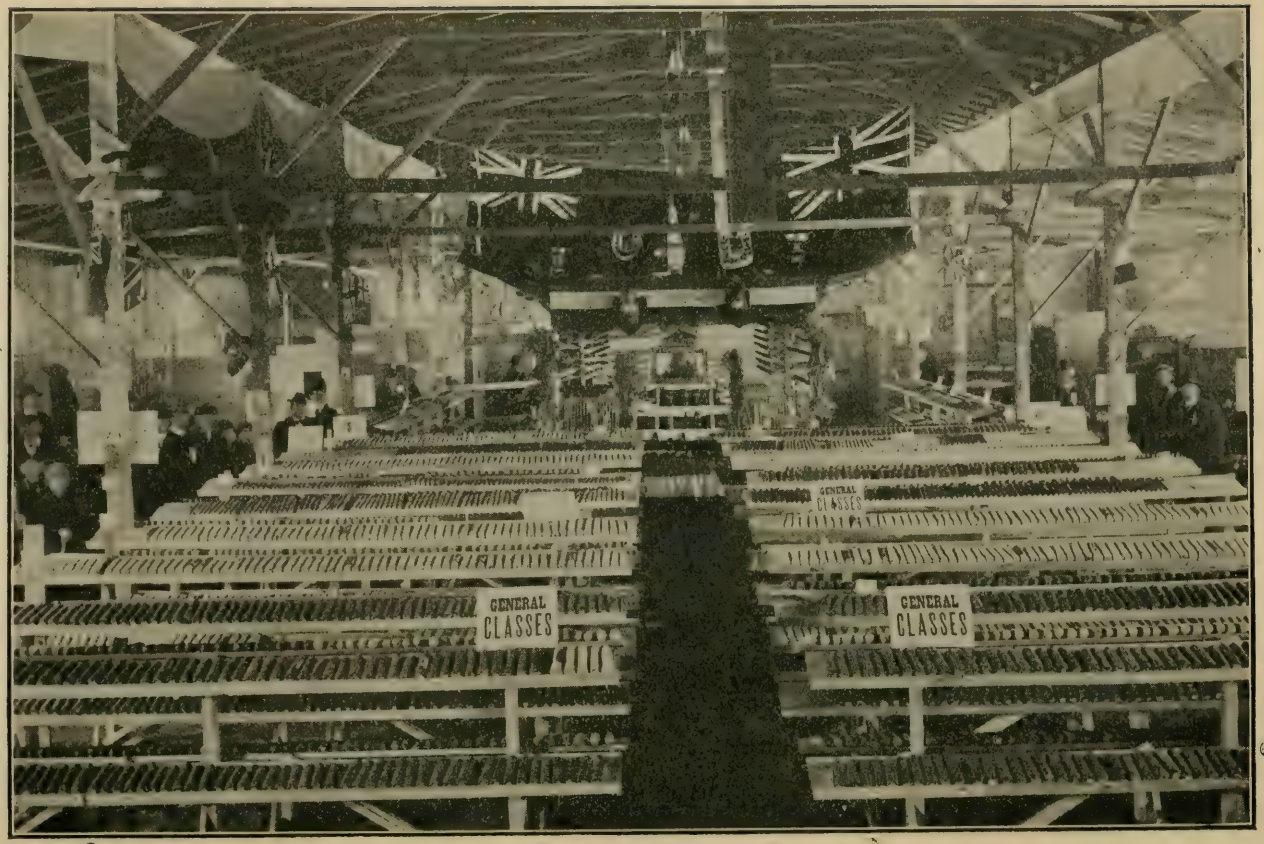
I have the pleasure to present herewith for the consideration of your Honour the Report of the Corn Growers' Association for 1916.

Respectfully submitted,

WILLIAM H. HEARST,

Minister of Agriculture.

Toronto, 1917.



General view of the Corn Show.

CORN GROWERS' ASSOCIATION

OFFICERS FOR 1916-17

Honorary President ..... Byron Robinson, Wheatley.
President..... R. W. Knister, Comber.
First Vice-President..... Lester Gregory, Chatham.
Second Vice-President..... L. D. Hankinson, Aylmer.
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Stewart McDonald, Pt. Lambton.
Stewart L. Pierce, Wallacetown.
R. H. McLennan, Aylmer.
S. M. Pierce, Iona.
Wm. McCutcheon, Glencoe.

FINANCIAL STATEMENT FOR THE YEAR ENDING FEBRUARY, 1915

Receipts.		*Disbursements.*	
Balance from last year	$302 62	Prizes	$1,168 25
Legislative grants	652 50	Printing	428 28
Essex County grant	250 00	Expenses of directors and local judges	351 97
Kent County grant	250 00	Expert judges and lecturers ..	152 50
Township grants	335 00	Advertising	118 85
City of Chatham grant	200 00	Express, cartage, etc.	120 25
Building for Corn Show, heat, lighting, etc., furnished by Chatham City	300 00	Building, light, heat, shelving, etc.	300 00
Membership fees	418 50	Corn for class work	15 00
Space in exhibition building sold	253 00	Grants to school fairs	20 00
Advertising in prize lists ...	288 00	Band and elocutionist	49 15
Donations	170 00	Postage	72 60
Kent Publicity Association ...	47 00	Membership buttons	31 40
Refund of express	14 67	Engraving medals, etc.	20 92
		Salary of secretary	150 00
		Salary of treasurer	50 00
		Stenographers	32 00
		Janitor	25 00
		Photographer	4 65
		Auditors	8 00
		Incidentals	20 73
		Balance on hand	341 74
Total	$3,481 29	Total	$3,481 29

FINANCIAL STATEMENT FOR THE YEAR ENDING AUGUST 31, 1916

Receipts.		*Expenditures.*	
Balance on hand at last audit	$341 74	Prizes	$1,032 35
Legislative grant	580 00	Expenses of directors and local judges	390 86
Kent County grant	250 00	Printing	242 40
Essex County grant	250 00	Advertising	283 58
Township grants	410 00	Building for exhibition, shelving, light, fuel, etc.	300 00
Membership fees	445 50	Postage	84 08
City of Chatham, cash	200 00	Express, cartage, etc.	69 79
City of Chatham, building, for exhibition, shelving, light, fuel, insurance, etc.	300 00	Expert judge, services and expenses	80 00
Donations	160 50	Membership buttons	18 34
Advertising in prize list	146 50	Stenographic report	25 00
Space at exhibition	122 00	Paper for shelving	13 20
Sundries	2 00	Moving pictures	10 00
		Cotton sacks for grain exhibit	11 20
		Banners	8 50
		Hardware, lumber, etc.	10 90
		Photos of prize samples, etc.	9 25
		Secretary	150 00
		Treasurer	50 00
		Stenographer	25 00
		Auditors	8 00
		Harwich School Fair	5 00
		Night watch and carpenters	17 00
		Exchange	3 29
		Rent of typewriter	1 00
		Sundries	1 12
		Balance	358 38
Total	$3,208 24	Total	$3,208 24

FINANCIAL STATEMENT FOR THE YEAR ENDING JUNE 4, 1917

Receipts.		*Expenditures.*	
Amount on hand from last audit	$358 38	Directors' expenses	$341 86
Legislative grant	500 00	Printing	134 14
Kent County grant	125 00	Advertising	314 07
Essex County grant	250 00	Prizes	758 90
Municipal grants	300 00	Stenographer	29 00
Membership and gate receipts	320 65	Engraving trophies	15 45
Donations	55 00	Secretary	100 00
Building, light, heat, etc., furnished by Kingsville	225 00	Assistant secretary	25 00
Advertising in prize lists	143 00	Treasurer	50 00
Space at show	116 00	Photographer	22 05
	$2,393 03	Special car	65 41
Assets,		Lumber	11 41
Cash on hand	$85 37	Postage	40 80
Liabilities,		Lecturers' expenses	29 00
Paid up members	208 50	Labor	42 52
		Messenger boy	10 00
		Freight and express	45 58
		Telephone	23 91
		Auditing	8 00
		Corn for class use	6 00
		Sundries	9 56
		Building, light, heat, etc.	225 00
		Cash on hand	85 37
		Total	$2,393 03

Ontario Corn Growers' Association

ANNUAL CONVENTION.

The Ninth Annual Exhibition and Convention of the Ontario Corn Growers' Association was held at Kingsville, Ont., Feb. 13th, 14th, 15th, 16th, 1917.

Owing to war conditions and disrupted railway services, the attendance was not so large as in some former years. However, the tabernacle in which the show was held was filled to capacity with entries of corn and small grains, three hundred exhibitors furnishing these competitive classes. In addition to the addresses given herewith, interesting speeches were made by John T. Miner, J. O. Duke, E. D. Eddy, W. J. W. Lennox, and others.

CORN IMPROVEMENT.

Prof. J. D. Harper of Indiana.

Corn shows are a great factor in corn improvement. As corn growers you get together and compare your exhibit here with that of your neighbor, and whether you agree with the judges' placings or not, I am sure you are going to get a keener interest and broader knowledge of the subject of Corn.

Every grower realizes the value of a variety which is adapted to soil and climatic conditions. The leading varieties in your show are undoubtedly among the very best for this latitude, and there is very little that I can say except that it pays best to grow the crop from home-grown seed as far as possible. Selection and breeding are the next most important things to keep in mind.

The breeding of corn for increased yields is more or less complex and a rather difficult task. It requires much painstaking effort and considerable time to follow the scientific methods that have shown increases in yield, yet there are a number of Corn Belt farmers who believe that they may profitably spend time in this way. These men are demonstrating that there are great differences in the yielding ability of individual ears of corn and that they can eliminate many weak and undesirable ears from their breeding plots by a preliminary ear-row test.

In six co-operative demonstrations which we conducted in Indiana during the past year some interesting observations were made. The purpose of these demonstrations was to show the value of selecting individual high producing ears by a performance test, the ultimate aim being to increase yields by taking advantage of the inherent productiveness of some ears over others of the same variety by using the high yielding remnant ears in a breeding plot the second year.

Fifty good type ears were selected and fifty hills from each ear were planted in individual rows on a uniform piece of soil. Each ear was numbered to correspond to the row number, and the unused portion was put away for future reference. Beginning with number "0," every fifth row, 5, 10, 15, etc., thereafter were check rows to correct for soil differences. The check rows were from a mixture of well-selected seed ears which were expected to give uniform yields. No attempt was made at detasselling since this requires too much time for the average farmer and was thought to be unnecessary for the purpose to be accomplished.

Variations in the plots were observed almost from the time the corn started to grow. Some rows came up sooner, were greener and more vigorous looking from the start. Other rows showed a great lack of vigor and vitality, although all of the ears were tested for germination and only 100 per cent. germinable corn was planted. Later in the season some rows were two and three feet taller than others, some were smutted, while others were practically free from smut, and some rows stood upright with not a single stalk blown over after all the storms, while other rows had such weak stalks that not one was left standing. The per cent. of good ears and nubbins also varied considerably, while the per cent. of immature corn was a noticeable factor in many of the rows.

The accompanying table shows the differences in yield between the five highest and the five lowest yielding ears on each farm. The variation between the highest yielding and the lowest yielding ears on one farm amounted to 45 bushels per acre after corrections were made for stand and yield.

EAR ROW YIELDS, 1916.

Bushels per acre.

Farm.	5 highest yielders.	5 lowest yielders.	Difference.
Fields	61.5	46.6	14.9
Thornburg	60.6	40.6	20.0
Kerlin	72.5	39.2	33.3
Fifield	45.6	25.7	19.9
Stevens	56.0	39.3	16.7
Helms	62.7	28.6	34.1

In such tests the value to the corn crop comes in getting a double check on the seed corn. Good type ears and high yielders can be chosen for a special multiplying plot by this method. By giving this plot especial attention in removing barren and smutted stalks, as well as all others showing a weakness, increases in yield of from five to ten bushels per acre may be expected according to results obtained by investigators. Such increases are well worth striving for on any farm.

Another great value of an ear-row test is in teaching the value of field selection of seed corn. No one can observe the inherent differences in strength of stalk, leaf development and smut infection and not realize the value of knowing the parent stalk. This will lead more generally to the practice of selecting seed corn in the field from the standing stalk before heavy frosts.

Field selection of seed corn will mean better germination and consequently better stands. We realized this in a little test at our station in the fall of 1914, when 93 ears of corn were selected from the stalk before November 1. Work interfered, and no more seed could be selected from that plot until the corn had been cut up and was ready to husk. At this time 320 more ears were selected and put on the racks with the first 93 that had been selected. In the spring the germination test showed that every one of the 93 ears selected before heavy frosts germinated 100 per cent., while of the 320 selected from the shock only 2 ears germinated 100 per cent., and the average germination of the 320 was 86 per cent.

This brings me to the matter of testing every ear of corn for germination. I can do no better than to tell you that there are very few things on the farm that will pay better for the time spent. A test conducted at the Ohio Experiment Station shows that on an average of nine years a yield was secured with tested seed

above that secured with untested seed that paid at the rate of $6.50 per hour for time spent with the germinator. No corn should be planted that does not show a perfect germination. Of course, this will be obtained largely by growing a variety of corn that will mature and then carefully selecting the seed ears and testing them before planting.

The next important thing is to have soil that is well prepared and sufficiently fertile to mature a crop of corn in good shape. We would advocate the use of all manure and crop residues and the use of some fertilizer where it is known to be needed. Phosphate fertilizers have proved to be of considerable value in hastening maturity and most clay and loam soils will respond with a profit to applications of acid phosphate.

John McRae, Port Lambton, winner of Senior Judging Competition.

Cecil Parker, Essex, winner of Junior Judging Competition.

All these facts point to greater yields per acre, and that is what we want. In a Five-Acre Corn Growing Contest in Indiana we have secured cost data on over 750 fields of five acres or more. These men have kept account of their cost of production by charging, man hours at 20c, horse hours at 7½c, seed at cost, fertilizer at cost, and manure at $2 per ton. Only one-half the value of manure and fertilizer, however, have been charged to the corn crop. Husking has been charged at 3c per bushel, and rent at $6.00 per acre. On this basis the following interesting figures show the reason for increasing yields:

RELATION BETWEEN YIELD AND COST.

Yield.	No. in class.	Average cost per acre.	Average cost per bushel.
		$ c.	c.
30 — 40 bush.....	15	12 50	34.5
40 — 50 "	51	13 37	29.3
50 — 60 "	203	13 30	23.6
60 — 70 "	225	14 21	21.8
70 — 80 "	178	14 39	19.2
80 — 90 "	67	14 57	17.3
90 — over bush.....	15	15 98	17.2

This shows that the 15 men who grew between 30 to 40 bushels per acre grew each bushel at a cost of 34.5c, while the 15 men who grew over 90 bushels grew their corn at a cost of 17.2c. per bushel, slightly less than one-half as much, Hence we see the wisdom of better methods and greater production.

CORN AS A FEED.

Prof. G. E. Day, O.A.C., Guelph.

Importance of Corn.—In this country corn does not occupy so important a place in our agriculture as it does in the United States. In acreage, in total production, and in value of grain, the corn crop in the United States exceeds that of wheat, oats, barley, rye, kafir, milo, emmer, buckwheat, and rice combined. While it is true that corn in Canada does not occupy nearly so important a place as it does in the United States, it occupies a sufficiently important position to render it worthy of careful study by our farmers. Unfortunately corn cannot be grown in all parts of Canada, since it is a hot weather plant, but we are finding that it is capable of wider distribution than we formerly supposed.

Composition.—The following table shows the composition of Dent and Flint corn in comparison with wheat, barley, and oats:

—	Ash.	Crude Protein.	Carbohydrates.		
			Fibre.	Nitrogen—free extract.	Fat.
	%	%	%	%	%
Dent Corn	1.5	10.1	2.0	70.9	5.0
Flint Corn	1.5	10.4	1.5	69.4	5,0
Wheat.....	1.9	12.4	2.2	71.2	2.1
Barley	2.7	11.5	4.6	69.8	2.1
Oats	3.5	12.4	10.9	59.6	4.4

In the first place notice that corn is lower in ash and crude protein than wheat, barley or oats. The ash of a food goes to build up the bony structure, and hence plays an important part in the growth of young animals.

The protein is used in building up muscles and substances of simliar composition, and also plays a very important part in the elaboration of milk. We learn, therefore, that as a bone and muscle former, corn falls below our other well-known grains, and, as a matter of fact, falls below requirements of young animals,

and hence is not suitable to constitute the exclusive ration of young growing animals. Its composition also indicates, and practical experience has demonstrated, that corn is not a first-class ration for milk production.

Carbohydrates, in general, are used by the animal to keep up the heat of the body and also to provide energy. In addition to this, carbohydrates may produce fat in the animal body. It will be noted that the carbohydrates are divided into two groups, namely fibre, which is the woody portion of the food and which is difficult to digest, and nitrogen-free extract, which represents the more soluble carbohydrates, such as starch, sugar, and similar substances, and hence the most valuable part of the carbohydrate group.

The fat or oil of the food is also used to keep up heat and energy, and to produce fat in the animal body. Its value is very much higher, pound for pound, than carbohydrates.

Comparing corn, in regard to carbohydrates and fat combined, with the other three grains, we find that corn has a decided advantage. It will be noted also that the percentage of fibre is very low in corn, which is another advantage which it possesses. Summing up all these peculiarities of composition, we find that corn is low in bone and muscle-forming constituents, but that it is very high in heat, energy and fat forming constituents. In other words, we may say that corn is essentially a fattening food, being much better suited for producing fat in matured animals than for producing growth of bone and muscle in young animals. If we keep these points clearly in mind it will enable us to avoid many mistakes and to secure much better results from the feeding of corn.

Incidentally, it may be noted in passing, that Dent and Flint corn are practically equal in feeding value, which both composition and feeding tests indicate. It may be added, also, that yellow corn and white corn are practically equal in value for feeding, though for many years there was a strong prejudice in favor of yellow corn. Chemical analysis, and carefully conducted feeding tests, have shown that the prejudice in favor of yellow corn was, to say the least, not well founded.

Rational Use.—It has been stated by some authorities that corn is one of the best, and at the same time one of the worst, feeds for stock. That is to say, when corn is not understood and no attempt is made to provide for its deficiencies, especially when feeding young animals, such as young pigs, it makes a very unsatisfactory feed, but when the feeder realizes the deficiencies which corn possesses, and mixes with his corn feeds which make up for these deficiencies, he has one of the very best feeds for animals. Feeders have learned that to use corn to the best advantage it is better to supplement it with some feed rich in protein and in ash.

In the case of beef cattle, clover or alfalfa hay give excellent results with corn, because hay of this kind is rich in ash and protein and makes up the deficiency in corn in these respects. The same also applies to the feeding of sheep, though perhaps even with these animals it would be better to add a certain proportion of concentrates richer in protein than corn. Bran answers very well for this purpose.

For dairy cattle it is even more important to add protein rich feeds, and, in addition to clover or alfalfa hay, cotton seed meal and bran can be fed to advantage along with corn. When corn is ground into meal the addition of bran also has the advantage of making the meal somewhat lighter and more bulky in character, and hence more readily digested.

For the feeding of swine there is no grain more widely used in the United States than corn, and possibly there is no grain more abused in its use than

is corn, although methods of feeding have improved very materially in late years. Hogs are different from cattle and sheep in that they do not consume much bulky feed, and hence we cannot make up deficiencies in protein and ash by feeding them leguminous hay, as in the case of cattle or sheep. The farmer does not very often take this fact into consideration, and his pigs are fed almost exclusively upon corn, in which case unsatisfactory results are sure to follow, and the younger the pigs the more injurious the practice of exclusive corn feeding. Dairy by-products, tankage, or even wheat middlings, or shorts, can be used to excellent advantage with corn, for pigs. When corn is judiciously combined with substances rich in protein it makes one of the very best fattening feeds that can be obtained for swine, although it cannot be regarded as satisfactory for bacon production.

Even farm horses can be fed successfully on corn in the place of oats. Of course, it would not do to feed the same bulk of corn as one would feed of oats, because corn weighs more per measured bushel than oats, and due allowance must be made for this extra weight. Used with judgment corn may successfully take the place of oats, especially in the case of horses doing farm work.

By-Products.—The most important by-product of corn is gluten feed, which is the residue from the manufacture of starch from corn. High-grade gluten feed may contain over twenty-five per cent. of protein, and lower grades may fall below eighteen per cent. It will be seen, therefore, that in any case gluten feed is a valuable product to increase the protein content of a ration. It is best suited for feeding dairy cows.

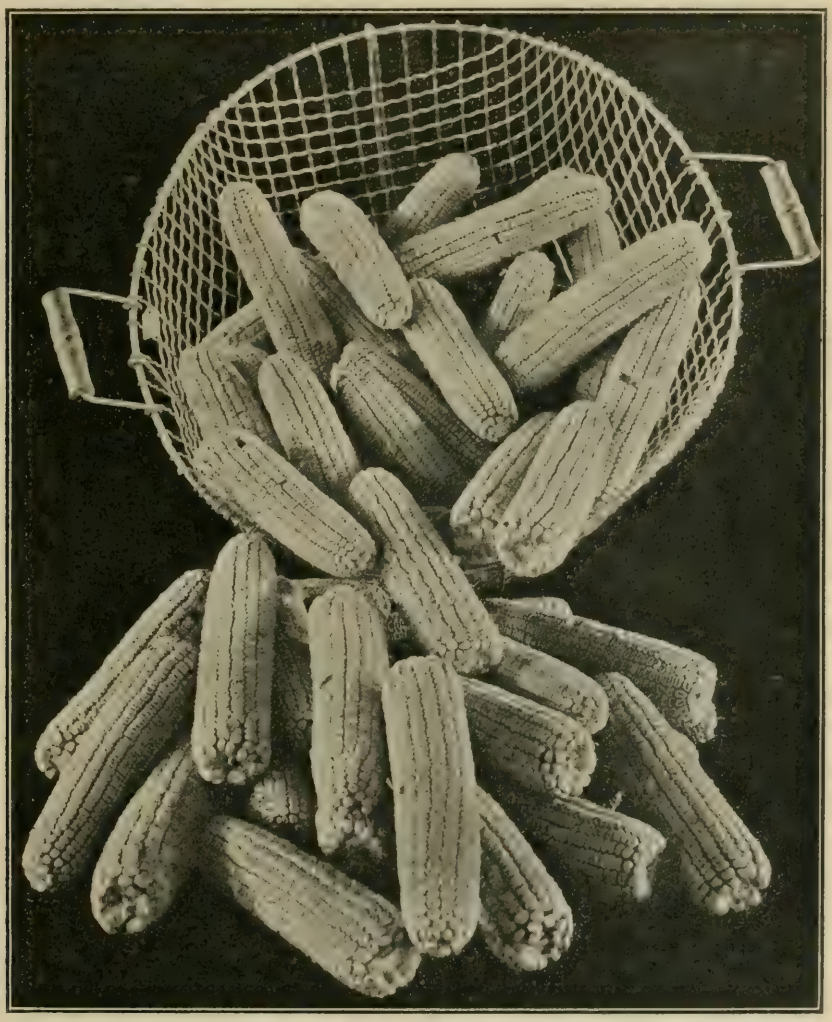
Other by-products of corn, such as gluten meal, which is higher in protein than gluten feed, and germ oil meal, which is somewhat lower in protein but higher in fat than gluten feed, are not so well-known in this country.

Corn as a Forage Crop.—In only a very restricted area of this country can corn be grown satisfactorily as a grain crop, but in most parts of Ontario, and in large areas of other provinces, corn is one of the most highly valued of forage crops. Its large yield of feed, the palatability of the fodder it provides, and the opportunity it affords for checking the growth of weeds, through cultivation, all tend to give it a most important place in our agriculture.

It is as a silage crop that corn especially commends itself to the farmers of this country, and even in the corn belt of the United States we find numerous silos coming into use. For years it has been a disputed point whether it is more profitable to put the whole corn plant into the silo, or to first remove the ears, in districts where corn will mature sufficiently for husking, and feed the stalks separately. This matter was tested at both the Wisconsin and Vermont Experiment Stations, and at both stations results were decidedly in favor of putting the whole crop into the silo instead of first removing the ears and putting only the stalks into the silo. At the Vermont Station it was found that one acre of green corn fodder, including ears, reduced to silage, was equal in feeding value to 1.26 acres of silage from stalks stripped of their ears and fed with the meal made by grinding the dry ear corn which was produced by the crop. So far, therefore, as the part of the crop which has to be fed at home is concerned, it would evidently be the part of wisdom to put the whole crop, ears and all, into the silo instead of going to the trouble of first removing the ears.

Quality of Silage.—In our northern latitude the selection of suitable varieties of corn for silage becomes very important. We all know that the large, late maturing varieties of corn will give us a very much larger yield, per acre, than the early maturing varieties, and the question is just where we should draw the line.

That is to say, should we select a very early maturing variety, regardless of the fact that it is a light yielder, or should we sacrifice quality and take a very heavy yielding variety, which will not mature in our locality, or should we follow an intermediate course and secure a moderately large yield with a moderate degree of maturity? During the summer of 1915 we started some work along this line, and



Champion bushel of Dent Corn. Winner B. R. Cohoe, South Woodslee.

Mammoth Southern Sweet, White Cap Yellow Dent and Longfellow varieties of corn were put into our silos, and their effect upon the milk yield of cows was tested. The summer of 1915 was wet, and the corn was, in consequence, rather late in maturing. On the Mammoth Southern Sweet the ears were barely formed, White Cap was in the medium milk stage, and the Longfellow had reached the dough stage. The silage from the Mammoth Southern Sweet was very sour, and it took several days, as a rule, to get the cows to eat it satisfactorily after being fed other silage. The silage from both the othe varieties was quite satisfactory.

Two tests were made to compare Longfellow silage with that from the Mammoth Southern Sweet. In one of these tests Longfellow silage proved worth $1.43 a ton more than that from the Southern Sweet.

Two tests were also made with White Cap silage against Southern Sweet silage. In one of these tests White Cap silage proved to be worth $1.11 per ton more than the silage from the Southern Sweet, and in the other experiment the White Cap silage was worth $1.64 per ton more than the silage from the Southern Sweet.

Both these comparisons were made on the basis of $1.60 per hundred for milk, which is a reasonable valuation under prevailing circumstances.

So far as these tests are concerned, the evidence is strongly in favor of the intermediate variety, which gives a good quality of silage combined with a large yield. Apparently there is no advantage obtained by having the corn nearly mature at the time it is put in the silo. On the other hand, the very late variety produced such sour silage that it was entirely unsatisfactory, and the difference in yield did not compensate for the difference in quality.

Conclusion.—A great deal more could be said regarding this remarkable crop, but time will not permit. All that has been attempted is to call attention to the peculiarities of composition and the weaknesses as well as the strong points of corn as a feed for stock, and we must leave it to the intelligent feeder to feed in such a way as to overcome the defects and secure full benefit from the merits of this crop, which is doing so much towards solving our live stock problems.

PREPAREDNESS FOR CROP PRODUCTION.

Dr. C. A. Zavitz, Professor of Field Husbandry, Guelph.

According to the latest statistical information obtainable, the value of the farm crops of Canada is more than double that of the combined values of the products of the forests, the mines and the fisheries of the whole Dominion. The products of the fields surpasses in value the products of the forests by about five fold, those of the mines by six fold, and those of the fisheries by twenty-six fold. The farm crops of Ontario alone were greater in value than the products of the forests, the mines and the fisheries of all the provinces combined. It is undoubtedly true that the progress of Ontario is closely associated with the crop production of the Province, which amounts to over two hundred million dollars in a single year.

Owing to the high cost of living both at home and abroad, and the great demand for foodstuffs at the present time, it is important for us to serve our country and humanity by producing as much as possible. The fact that labor is exceptionally scarce makes it even more urgent on our part to put forward every endeavor to do our utmost under existing conditions. By careful planning and constant endeavor much more can be accomplished than many people realize. Surely we have the knowledge by which we can materially increase the products of our fields. Would it be too much to say that each of us might to advantage use a greater amount of forethought, system and business in our farming operations. We should plan long in advance for the crop production of the coming year. The varieties of farm crops most likely to give the best results should be selected and the seed carefully tested and properly prepared in readiness for the first opportunity of seeding in the spring.

Grow Known Varieties.

It is exceedingly important to grow known varieties of farm crops of high quality. It is also important to make the very most of the good seed which is available in Ontario before we run the risk of buying mixed and impure varieties from bulk lots brought from either the Western or the Eastern Provinces.

Let us make more use of the fanning mills in Ontario to get the very best seed from the crops produced on our own farms. Even under adverse weather conditions such as we had in 1916, we would find that we could secure a good supply of seed if we would only take the pains to obtain from ten to twenty or thirty per cent. of the best seed and use the larger bulk of lighter grain for feeding purposes. The good seed which is grown under adverse conditions is generally of superior quality. It is unfortunate that in so many instances but little thought is given to the proper supply of seed until the crop is mostly fed to the farm stock and, as a last resort, the grain for sowing is taken from the remainder, which is left in the bins or it is purchased at a late date from the source most available at the time.

There were several directors of the Corn Show at the breakfast table at the hotel this morning, and I asked, "What percentage of the oats grown here would be quite suitable for seed purposes?" and they said about twenty-five per cent. or thirty per cent. Now, I think that is a strong point. If we can get twenty-five or thirty per cent. under adverse circumstances, such as we had last year, if we get the very best out of the whole amount of twenty-five or thirty per cent. that is good, that gives probably a higher result than ordinary seed, of a truth, you have got the seed that had the inherent value to go through the severe winter, which will be a better grade of seed for you to use.

I remember a few years ago a Mr. Toole (Louis Toole, living out of Toronto a few miles) was President of our Experimental Association. He was farming north of Toronto, about thirty years ago (I didn't mention, but I should have, the fact that he really organized our Experimental Union), and thirty years after he was there the first time he was back there as President, and I remember when he was there making his Presidential address. I was the Secretary then. And I remember him saying that twenty-five years previous to that he had a farm filled with red clover and he saved the seed, that came through a very severe winter, sowed it the next year, and he found he had a much hardier seed than before, and he handed me a little packet of the Red Clover seed that he had grown from this hardier seed. We have that seed at the College, and we are working with it now, and I believe it is a hardier seed because it came through that very severe winter. And I believe that in Ontario, although we had such a very severe winter this last year, the oats that come through this winter, if we use our fanning mills, if we get the best twenty, thirty or forty per cent. to use for seed—I believe that will lead to getting better results, to better seed than we can get from the West.

Beware of Foreign Agents.

I consider it is indeed unfortunate that in many parts of Ontario agents representing American seed firms are going from door to door throughout the country selling at high prices small quantities of new varieties of farm crops or old varieties under new names. We already have far too many varieties of nearly all classes of crops, and we should endeavor to confine our energies to a few of the very best kinds. Only last year American agents sold over Ontario the O. A. C. No. 72

oats under the name of Imperial, and at a price three or four times as great as the farmers of the Province were asking for good seed of the O. A. C. No. 72 Oats which they grew themselves. This is a serious matter, and I ask for your earnest co-operation in the endeavor to keep the varieties down to as small a number as possible and to improve the uniformity, the quantity and the quality of our products.

I want to go a little more into detail with regard to these impositions by agents. At the time of the fair at Guelph, a man came from New York on the excursion with the crowd from Welland. This man observed in going over the fields the O. A. C. 72, which was standing out in a very prominent way. He came again. I was away at the time, and he came back in a car to examine the oats more carefully. Then he wrote to ask if I would give him a full description of it, and I wrote and gave him the full description, and then he asked if I knew where he could get the seed, and I said Fred Foyston of Simcoe had it. So he wrote him. Later he wrote me, that he was sold out, and could I suggest another man. I told him of another man who had the seed that was practically pure, Mr. Cockburn. He bought two hundred bushels from Mr. Cockburn and sowed them for seed, and the next year they sold it all over the country, sold it for seed under the name of Imperial at $3.65 a bushel.

I ordered some Imperial oats. I knew the agent, and at the time I wrote to the people and said: "I want you to send the oats and potatoes right away, because I want to sow them very soon." I was getting some potatoes from them at the same time. They wrote back that they were sorry, but that the order had been sent in too late for them to send the grain. I wrote them and asked them to send me a catalogue. They wrote back to me that they were sending the catalogue, and they said, "You will notice in the catalogue that the Imperial Oat is your O. A. C. 72." I had put in the order for Imperial Oats. It was the same oat that we originated, that is now sent out all over Ontario and was being sold first at $2.50, the next year for $2.00, the next year for $1.50, and that year it was $1.00 a bushel, and the Imperial Oat was selling for $3.65. $3.10 was the very lowest you could buy it for. I enjoin you to be very cautious in growing crops until you know what you are growing. We want only to grow a few of the very best varieties.

Importance of Good Seed.

In regard to some definite experimental work which we have carried out, in the first place I want to talk about something in connection with the value and importance of sowing good seed.

Every farmer should realize that good seed is at the very foundation of good farming. One cannot expect to receive a satisfactory crop from seed of inferior quality. Good seed does not mean freedom from impurities alone, but it also means seed of strong vitality with the inherent power of producing large yields of crops of high quality. Various experiments have been conducted at the College in the study of seeds of various, different selections. Some of this work has been continued up to the present time, and the results, some of which have not been published before, are both interesting and valuable.

For this experiment seed was taken each year from a general crop of grain which was grown at the College. It will, therefore, be understood that the average differences which will be here shown represent the influence of the selection of seed of simply one season, but, in order to get as reliable results as possible, experiments were repeated for several years in succession. For the large, plump seed, none but

well developed grains were used. For the small, plump sample, the grains selected were of a uniform character. For the shrunken sample, none but shrunken grains were used. The broken grains were those selected as the result of the process of threshing. Of the selection of large, plump seed, one-half pound was carefully weighed from each class of grain, and these were counted, and a corresponding number taken of the medium-sized grains, the small, plump grains, the shrunken grains and twice the number of the broken grains. The different selections were carefully sown in plots of similar size. And then the next year we tried it again, and the next. The table here represents one season's influence of grain selection from experiments which were repeated at the Ontario Agricultural College from five to nine years.

RESULTS FROM SEED SELECTION.

Selections	Class of Grain	Years the tests have been repeated	Weight per measured Bushel (Pounds)	Average yield per Acre per annum	
				Tons of Straw	Bushels of Grain by weight
Large seed	Oats	7	33.2	1.9	62.0
Medium-sized seed	Oats	7	32.2	1.8	54.1
Small seed	Oats	7	31.8	1.8	46.6
Large plump seed	Barley	6	49.5	1.5	53.8
Small plump seed	Barley	6	48.8	1.5	50.4
Shrunken seed	Barley	6	49.1	1.4	46.0
Broken seed	Barley	6	48.6	1.3	43.2
Large plump seed	Spring Wheat	8	59.1	1.4	21.7
Small plump seed	Spring Wheat	8	58.3	1.3	18.0
Shrunken seed	Spring Wheat	8	56.9	1.2	16.7
Large plump seed	Winter Wheat	6	59.4	2.6	46.9
Small plump seed	Winter Wheat	6	59.2	2.2	40.4
Shrunken seed	Winter Wheat	6	59.1	2.1	39.1
Split seed	Winter Wheat	6	54.2	.6	9.3
Large seed	Peas	6	56.3	1.3	28.1
Small seed	Peas	6	56.3	1.1	23.0
Sound seed	Peas	9	58.1	1.4	29.2
Split seed	Peas	9	57.9	.6	10.2
Large seed	Spring Rye	5	53.1	2.1	25.4
Medium-sized seed	Spring Rye	5	53.2	2.1	24.4
Small seed	Spring Rye	5	53.5	2.0	22.2
Broken seed	Spring Rye	5	.....	1.7	15.9

The average results of the experiments on seed selection show that the size, the plumpness and the soundness of the seeds exert decided influences on crop production. In every instance large, plump seed produce higher results than small, plump, shrunken or broken seed. These results emphasize the great importance of thoroughly cleaning our grain in order to secure the most perfect seed for the purpose of reproduction.

In an experiment extending over a series of years, in which winter wheat of each of two varieties was cut at five different stages of maturity, it was found that the wheat which had become thoroughly ripened furnished the best seed. The grain obtained from the last cutting produced a slightly increased yield of both straw

and grain per acre and a heavier weight per measured bushel than that produced from seed secured from any other of the earlier cuttings. Experiments appear to favor the use of seed of our grain crops which has been thoroughly matured.

Dates of Seeding.

Not only is it important to use good, pure seed of the best varieties of farm crops, but it is also important to sow seed of the different kinds of grain at the right time to furnish the best results. In each of five years, an experiment was conducted at the College in which Spring Wheat, Barley, Oats and Peas were sown both broadcast and with the grain drill on each of six different dates. The first seeding with each crop took place as early in the spring as the land was warm enough to work to good advantage. One week was allowed between each two dates of seeding. The experiments were conducted on what might be termed an average clay loam on different sections of the experimental grounds at Guelph. The following table gives the average results in bushels of grain per acre for the ten separate tests conducted in the five-year period with each of the four classes of grain here referred to:

Seedings	Bushels of Grain per Acre			
	Spring Wheat	Barley	Oats	Peas
First	21.9	46.2	75.2	25.4
Second	19.2	45.9	76.0	28.8
Third	15.4	39.8	64.2	28.7
Fourth	13.0	37.1	55.8	25.5
Fifth	8.4	27.6	45.2	21.5
Sixth	6.7	18.4	37.0	19.5

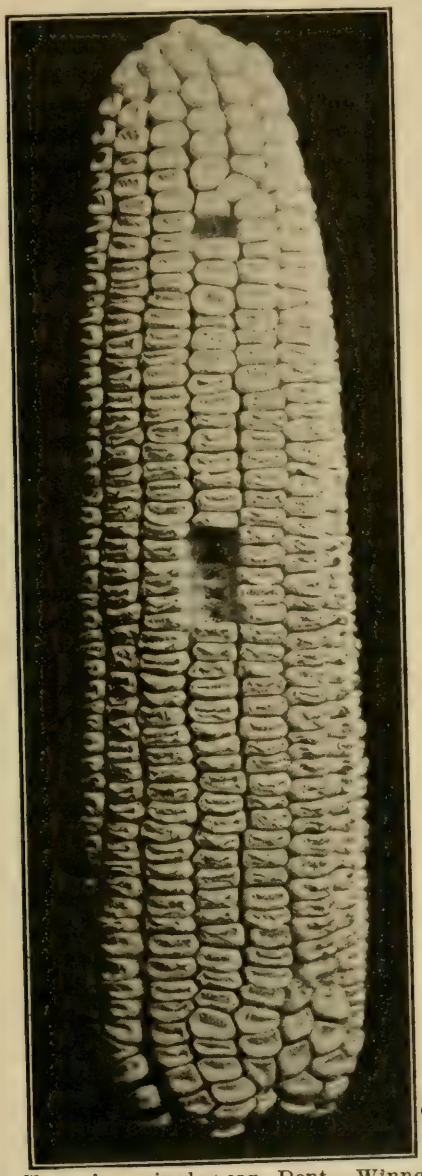
The results from the different dates of seeding are very pronounced. It will be seen that the Spring Wheat gave decidedly the best results from the first date of seeding, and that the peas gave the best results from the second date, and with the fourth, this crop gave even as large a yield as the first date of seeding. There was but little difference in the results between the beginning and the end of the first week in which either the barley or the oats were sown. After the second date, however, there was a decided decrease in each class of grain.

It is interesting to note that for every day's delay in the time of seeding after the first week had passed there was an average decrease in yield per acre of 47.4 pounds of oats, of 47.1 pounds of barley, of 26.8 pounds of spring wheat and of 19.9 pounds of peas.

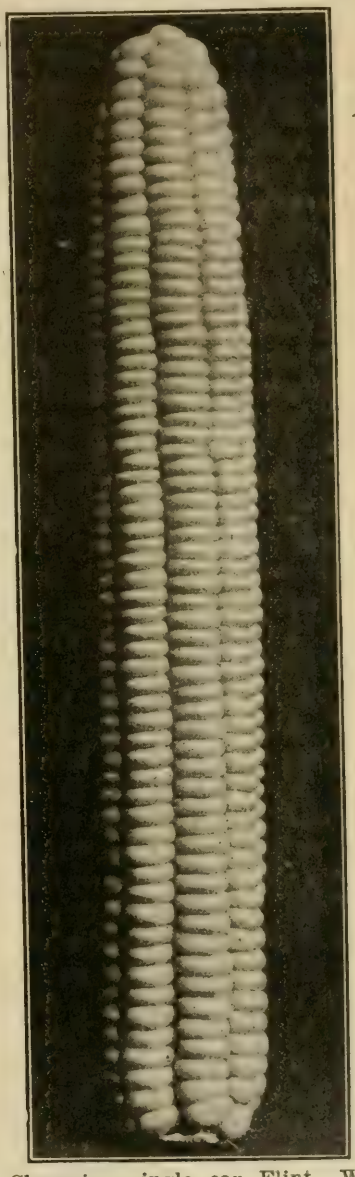
It is important to sow spring wheat, barley, oats and peas in the order here given and to try if possible to have the seeding completed within a week or ten days after the land is workable to good advantage in the spring.

This shows us several things. First, to put in seed in the right order. We saw it was best to sow, first, spring wheat, then barley, then oats, and then peas. If we have definite information it proves a very good guide. I know, when in Bruce County on a Demonstration Train, a number of farmers told me that they usually sowed peas first. I asked them why, and they said they didn't know, they usually did it, but they didn't know any definite reason why. Now, I think they are wrong.

At Guelph we got entirely more satisfactory results by sowing spring wheat first and peas last. If you sow spring wheat first and peas last you get enough growth for both, but by starting with first, the spring wheat, then barley, then oats, then peas, and then corn, my conclusion from that experiment is that after the first week



Champion single ear Dent. Winner George Coghill, Kingsville.



Champion single ear Flint. Winner A. S. Maynard, Chatham.

is past that you save the decrease for every day they lie, of 47.4 pounds of oats per acre, of 47.1 pounds of barley per acre, of 26.8 pounds of spring wheat per acre, and 19.9 of peas per acre, which is the percentage you lose for every single day's delay after the first week is passed that you can get on the land to good advantage. for sowing.

Get the Seed Ready in Time.

We may not realize that. We may go out on the farm, and there is some plowing to be done that we didn't do in the fall, and we look across the farm, and the first thing we see is that the first field we sowed is all green, and you say, "Why, I didn't think that grain would be up. It was only three weeks ago last Wednesday that I sowed that field." Time goes and we don't realize it, and it is important. I believe that at the present time, with the scarcity of labor, that the best thing to do is not to work any harder—I believe we are doing the best we can—but to get our seed ready, and that is exceedingly important. Get the best varieties, then, get them ready in the winter time, and I believe the great thing is to make use of old seed just as much as we can, get our seed ready and when the spring comes get it in just at the right time.

We can get ready for that just now. In that way we are going to increase our crop. If we wait until spring, and have our oats nearly all fed and just get our seed from what is left, it is going to be serious, and are we going to get the returns we should, not the ones we could get if we saved the best oats for our seed and fed the rest to our cattle in the winter.

I spoke in the beginning about Mr. Miner's interest in our common bird life, and I want to interest you to some extent in the common plant life. I remember when we started the short courses in Toronto a number of years ago. It was at the first a stock-judging short course, and we thought it would be fine to have a good grain short-course. I wanted to know if they would be very much interested in seed grains, because most of the men were stock growers and must grow feed. We started in the morning, and just before we opened a man came to me and said, "I think that eight o'clock is rather too early for us. Most of us are in boarding houses, and it is rather hard for us to get here." "Well," I said, "we don't know, but we are going to see how this will work out—we'll give it a trial, anyway." About the third morning a person got up in the class and said, "Couldn't we start here at eight o'clock instead of half-past?" We hadn't been starting sharp on time. Well, we discussed the thing, and there was about half the class wanted to start at eight o'clock, but we knew the difficulty for a great many to get out there, so we had it at half-past eight, and we have always had it at half-past eight.

In the classes, in the early stages, the men were nearly all sixty and sixty-five years of age. I don't think that one of the students was under sixty years of age in that first class. We found when we came to discuss common grains that there was so much of interest that we have never had a short course since but what the number is increasing, from the first morning. I don't know of a short course in ten years when we had less than two hundred each year. I don't know of a man who didn't come and take the seed work who had come to take the stock course. There is this about it. More men have the advantage, by taking the short courses, and I hope you will all be there in good time. We had a large class in small grains in Chatham last year. We had about a hundred there. I brought samples with me this time, and we are going to have a class at 9.30 to-morrow morning.

System of Experiments.

We have over Ontario a system of co-operated experiments which was started way back in 1886. I remember when I was a student working at the College, doing up packages and sending them out. In 1886 we sent out these packages to twelve farmers who agreed to carry out the experiments and report to us. The next year

we had sixty, the next year one hundred and twenty-five, and the next year over four hundred. In 1914 we had over three thousand, and when the war is over we will increase that. We are sending out these seeds to the farmers, and they are putting them in plots and seeing for themselves. I simply say that if you want to get seeds this year of oats or barley to experiment on, just write to the College and we will be very pleased to forward it to you, and they soon increase.

When we first sent out our O. A. C. 21 Barley, we sent it in pound lots. There was one man, John Elson, in Hensall, who applied for the experimental seed and got it as everyone else got it. He said, "The O. A. C. No. 21 Barley gave me the best results. I saved the seed, put it in the field next year, and had a little over nine hundred bushels in three years from the one pound, and I sold it for $1.50 per bushel." Many other men had over a hundred bushels, but I don't know that anybody went as far as he did. He took particular care of his crop.

When the O. A. C. No. 72 Oats went through, we sent out three hundred pounds. Three hundred men got pound packages, but they didn't know what they were getting. We had tried it at Guelph, and every year since we have sent out the increase, all over Ontario. I know of several men who tried out the experiment. A father and his son both sent for the seed package, and tried it out. In the fall the father said, "I will hand over to you what I get from the experiment, and you can put it with what you get." From that he got 93 bushels next year—that is from both crops. He sowed that and got 3,400 bushels from the two pounds at the end of three years.

"I want to tell you about sixty bushels of O. A. C. No. 3 Oats I have," said a farmer in Oxford County. "It is very nice seed. You may wonder where I got it. I was up to one of your judging classes. I suppose I got three thimblesful, and I took them home and put them in a couple of rows, and the next year I had sixty bushels." That shows the value of the little things.

One year I planted a single little oat seed and got a plant, and I looked after it very carefully, and when it ripened I got the seed and put that in the next year, and the next year I put that in, and what do you suppose I got? From that one little seed, in three years I got one hundred bushels. The little seed was a good one, and the plant was a good one, the seed from that one little plant had 1,545 grains. We put it in very carefully. We gave every plant a chance, and then the next year we got a little over one hundred bushels. It pays to grow good seed of the best varieties. If I were receiving a present; if I were starting farming as a young man, and I was offered a present of one hundred bushels of good oats or an ounce of some choicer variety, I would take the ounce. Why? Because the ounce has the inherent value, and it would not be very long before that ounce would grow a large amount. And it would all be high quality seed.

Use of Western Oats.

Where shall we get our oats at the present time? Shall we use the Western oats or not? That is the question I have been asked several times since I have been here. There are three ways we can get Western oats at the present time: the general grading, Canadian Western Oats No. 1 and Canadian Western Oats No. 2. Those are commercial grades. They are brought in here for seed. They may have considerable amount of weeds, they may be plump, heavy oats, or they may be frosted. The Dominion Department of Agriculture, realizing that grain was going to be scarce, after the bad season this year, and realizing that the Western

seed would be brought in, and might do a lot of harm, have placed men at the Western elevators to watch the oats and pick out the best ones coming in and form them into classes—Canadian Western Oats No. 1 and No. 2. They found there were hardly any No. 1's. What did they mean: Number 2 Western Oats are white in color, give a fair percentage of germination and are allowed to contain not more than 8 to 10 wild oats per pound. Of course, there may be other impurities, but not more than 8 or 10 wild oats.

There is our standard, the No. 2 Canadian Western Oat Seed. Now the Department of Agriculture for Ontario has gone a step farther. They are bringing in some Banner Oats from the West, which weigh well, and which have a good percentage of germination, and are practically free from wild oats. I think that our district representatives have an eye on them, so don't, under any consideration, sow No. 2 Western seed oats if you can help it, and only sow the Banner oats brought in by the Ontario Department of Agriculture, if you cannot help it, if you are unable to get good seed from cleaning out your own oats thoroughly.

Preparedness! There was never a time when we needed to give closer attention to things which would tend to a better production in the things needed for our community and our country. Get the best varieties, get the very best seed you can, and sow it at the very best time, and it will surprise you with results you get.

The autumn of 1916 was much more favorable than that of 1915 for the preparation of the land for the spring crop. Plowing was well advanced, and the land, in most districts of the Province, received a fairly large amount of rainfall. The winter has been cold, but the land has been well covered with snow. Weather conditions, therefore, of the fall and winter have been favorable as a preparation for spring work. Let us do our best this winter, to have everthing in perfect order for immediate action as soon as the spring arrives. In all branches of farming preparedness is of great importance if the best results are to be obtained. May the farmers of Ontario watch every opportunity to prepare for an abundant crop in 1917. If we neglect to make the proper preparation for next spring's seeding until the season arrives, the results are apt to be very serious. If, however, we do our utmost to be prepared along the lines which I have indicated, as well as in other details not here mentioned, we will be amply repaid for our labors and feel that we have done a real service for the country in doing all that is in our power towards bringing forth an abundant harvest.

May the corn growers of Essex, the bean growers of Kent and the various farmers throughout Ontario arise to the occasion in the production of those things which are so greatly needed at the present time. This is the time for action, so let us get earnestly at work at the earliest possible moment.

OUR FEATHERED FRIENDS.

W. E. Saunders, London.

"When we consider bird life we are dealing with something entirely different from our life. We are interested in houses, in what we wear and in what we eat, but the birds think only of food and personal safety." Mr. Saunders went on to describe the different phases of interest to the birds, and told how the Orioles increase in numbers, but when they return after their winter in the south, only the original number will return to the same section. "The particular district is

calculated to support just so many Orioles. If you fix conditions so that it will support more, it is likely you will have more," he said. "Practically three out of every four birds hatched in a season, will be dead by the next season." Mr. Saunders told of the great value the Oriole is to the farmer as a grub destroyer, and advised that we should make it more pleasant for these birds, and encourage them to come to us.

"All kinds of insects and seeds are bird food. Most of the roots and fleshy stems of plants are bird food, and every different kind of bird takes a different kind of bird food." The speaker explained that a Sparrow does not eat mice, nor an owl seeds. "There are about seven hundred kinds of birds in Canada, and a great many others go through in the season of migration." The Creator did not go out of his way to make spectacular or odd birds; He just made them to fit into the different niches in nature."

He went on to describe the peculiarities of the Hawk and Owl which are birds of prey, why they are particularly adapted for their modes of life, their long talons and horny beaks for tearing the flesh of the little field mice they feed upon. He told of the digestive faculties of the Owl, and the method used in catching the prey.

He then spoke about the Woodpecker, another type of bird, which feeds on grubs in trees, and told of the manner in which this bird is provided with the means of providing for itself. "There are two chief varieties of this bird, the Spotted Downy and the Crested White, which are common to our country. The Woodpecker is specially equipped with a means of supporting himself while at his work of 'grubbing.' Unlike other birds, his toes are arranged two in front and two at the back of the foot. Other birds have three toes in front and one in the rear, The Woodpecker requires to have more support than his mere feet, so his tail is wedge-shaped and very strong, and when he takes up his location on the side of a tree he sits on his tail. His beak is very long and powerful. He throws his head back and then hammers his beak into the wood until he gets to the place where the bug has been, for of course that bug has moved by this time, he never would stay there if he heard the noise at his door and heard the Woodpecker knocking. But, of course, his beak wouldn't go into that hole and follow that bug up or down in the wood, so the bird is equipped with a special tool, a sharp little spear-like tongue. He turns that down into the hole after the insect and quicker than wink he turns that insect into a Woodpecker."

Mr. Saunders then told of the Chickadee, the smallest bird that stays with us in the winter that we are likely to see. They can readily be coaxed into friendship by a mixture of crushed nuts and suet. He described the mode of placing the mixture on the under side of a bracket beneath the window ledge, explaining that the Chickadee will eat it from an up-side-down position, while the Sparrows will leave it alone, being unable to get at it. Mr. Saunders imitated the Chickadee's whistle. The Nuthatch, another little bird that remains during the winter, can be enticed to your window by the same compound of walnuts and fat, and "he seems to like swallowing upwards."

Speaking of Sparrows, Mr. Saunders explained that there were many varieties, and as so much has been said about the destructive English Sparrow, many people have come to believe that all sparrows are injurious. However, that is not the case. He went on to describe the different classes of Sparrows common to our locality, the Song Sparrow which says, "Pres-pres-pres-byterian," the Road Sparrow, whose song starts with a whistle, the Vesper Sparrow, which also whistles,

and the Savannah Sparrow, which does not sing or whistle, but buzzes. Mr. Saunders gave imitations of all these vocalizations.

The White-throated Sparrow sings in triplets, and once in a while you will hear one that sings with a tremolo instead of a triplet. It is a very clear little whistle. The Ground Sparrow has a little bit of a wheezy whistle with a series of variations, something like a Meadow Lark. He went on to describe the distinctions of the Chipping Sparrow and the Field Sparrow, and giving thir calls.

Then Mr. Saunders described the fly-catching class of birds, those birds which secure their food by speed of wing, the Phoebe Bird, Wood Pee Wee and the Humming Bird. He told of the reasons for their fleetness, and the construction of their food-catchers. The Humming Bird he described at length, as it feeds upon honey as well as insects. The Humming Bird uses its long bill to ferret in the flowers for the honey sacks, but its bill is of little use to it as a means of getting the honey out. It is, however, provided with a long rubber-like tube, which is its tongue, and through this it draws the honey from the flower, having first made sure that it has caught any unwary insect that may have been lurking in the petals.

The nest of the Humming Bird is a very interesting little abode made of vegetable cotton and lichen, which will be found in the forks of twigs in secluded locations. The female constructs the nest, carrying on the work with amazing rapidity. Her ruby-throated mate takes little interest in the proceedings, seldom visiting her at all while the work is being performed.

Such is not the case in the family of the Wilson Pharalope, a species of the Sandpiper, which haunts the western plains. The gentleman Pharalope builds the nest, and, though it has never been proven that he lays the eggs, he is the one that sits on the nest and hatches them out, while his partner, with the other suffragette Pharalopes, is disporting herself in the marsh some distance away.

The Blackbird and Cow Bird are destructive birds, in that they destroy the nests or eggs of smaller birds, and should be guarded against, says Mr. Saunders.

His address throughout was most interesting, as he had the stuffed forms of each of the families he talked about and demonstrated the characteristics of each as he went along. The children were particularly interested in his exhibit of birds and eggs, and at the close of the lecture thronged to the platform to examine these.

FAIRS AND FIELD CROP COMPETITIONS.

William Scarf, President of the Ontario Fairs Association, Durham.

I am going to address the boys and girls this afternoon, because I see they are in the majority. I look back with pleasure to the time when I made my first exhibit, as a boy. My father had long been an exhibitor, and he had been successful and unsuccessful, but there was one rival that he could never beat. The night after I attended my first show I said, " Father, I wish you would let me try to beat that man." He said he would be only too pleased to let me. I think I was about nineteen at the time. I went home from that fall fair and I started to get right ready for the fall fair the next year. If you start in this work young you will never get away from the way you started. You will remember it all your life, and you will try to do better and better every year and you are bound to come to the top.

When I went into that competition I went in to win. The competition was

for pure-bred stock. I was not endowed with all the means that you may have, but I had good strong limbs and determination. I made a beginning and I succeeded, a few years ago, in breeding the animal that did win the competition.

The boys of to-day have so many more opportunities than the boys of my day had. The Board of Education has placed all kinds of opportunities before the younger generation. In the Parry Sound district, where the land is not as good as it is here, I saw the boys beating their fathers in the comparison of the potato crop. Now, we cannot say too much to encourage the boys in these exhibits.

I am glad to have this opportunity of meeting with the men from the land. I think, perhaps, I will be able to do a better work for you when I visit your homes and see the different crops you are growing on your farms.

Before I came to this country I had the pleasure of hearing a gentleman speak on Canada. He had a great many exhibits from this country to show the people what they could grow in Canada. I have found, since coming to this Canada of ours, that it is a great big place, and you can grow a great many things that we cannot in the country where I came from. Your exhibit here is one of the best I have ever seen. I never was at a Corn Show before, but I am proud to be here this afternoon.

You know we have meetings in Toronto and we have men come and talk to us upon the benefits of binding one part of the country with another, but we have never had a man there to explain to us about the seed corn crop and how it is grown. Now, I am going to do my best to have one of the best farmers here come to our exhibition and talk to the farmers there, of how he grows the seed corn, and tell them where they can procure good seed corn.

Regarding the Field Crop Competition I have been an official from the first. I have been a judge on the competition and was a means of bringing up the score card to its present high rating. I am proud to see the boys taking such an interest in the Field Crop Competition. One man in Middlesex who has two sons took me through his field one day. I showed them where they had fallen down on their crop, where the weeds were and where they had missed in turning in. There was nearly a foot missed every time they turned in, and they had not kept the weeds down. The boys took it all in. The next year I was proud to read the revised list of that Society. The boys were only about fourteen years old, and I was proud to see them come out second, that year and first the next year. It is the boys who are going to succeed.

When I was a boy we used to eat the large potatoes and plant the small ones, but the boys have shown us that we have been making a great mistake. By hand selection they have proved we can have all large potatoes and no small ones.

But I must tell the boys that they have not been responsible for all the good things. The most important wheat we are growing now was found by a little girl. She was taking a drink of water to her father, and she found a head of wheat. She took it and sowed it, and re-sowed it, and now they are raising that wheat all over the West, and it is one of the best grades of wheat known. It is the little things that count.

We went into this Field Crop Competition first as an experiment. We did not know where our money was going to come from to keep it up with, but we believed that the farmers, if they were shown how to farm properly, would realize the benefit they were deriving and would want to pass it on. We took as our motto, "Better Grain and Better Crops." I think we are going to succeed. I do not need to tell you how liberal the Government has been in connection with this competition.

The man who enters the competition must have his ground ready in the fall, and must have all his plans set. He must use select seed, because if he does not get the best seed he cannot expect the best results. Then work.

I can remember when we thought that if you grew some grain for three years in succession that you had to change the crop or you would not get results. We find now that it is better not to change seed, because you do not know how the seed you are getting has been graded up. The man who expects to get good seed should get a tried variety. There is a certain oat that will do a little better than any other in your locality. The same with any other grain. You must find out the one that is suited to your locality.

Then another important thing you must do, and that is to protect your seed from smut. Smut is a dangerous thing in a good many ways. It is dangerous to the animals, it is dangerous to the human being who is looking after the crop. We have found that the liberal use of formaline is the best cure for smut.

When we first commenced these Field Crop Competitions we had some difficulty in selecting judges, but I am going to ask you men whether we were not wise in our choice. One was your Secretary and one your Treasurer. Nearly all the men were picked from those who had been prize winners. We took them up to Guelph and trained them, we paid their expenses, but they gave us their time for nothing.

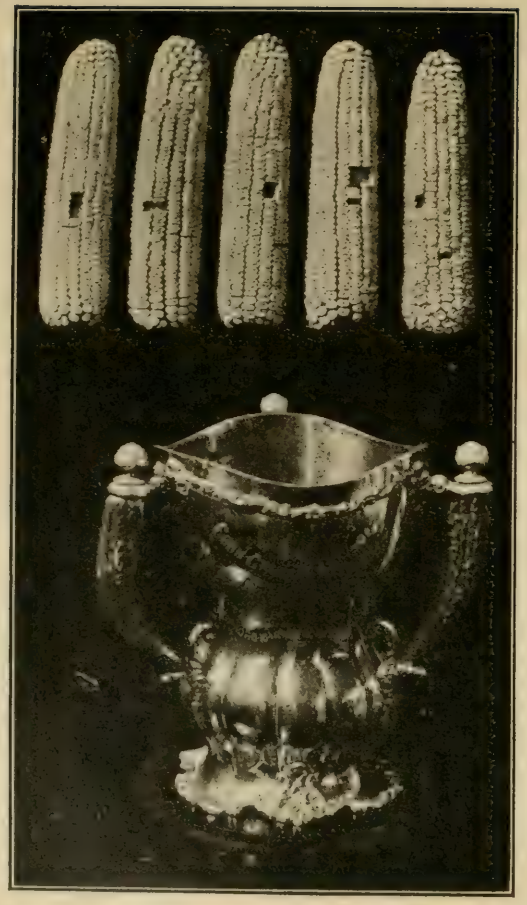
The first year we had no score card, but the second year the score card went out and we have tried since to remodel it. It rests with you men whether we shall remodel it or not. We, of course, can only recommend a change. We had thought that there should be one grade, one score card for silo corn and one for seed corn. The score cards will be sent out very soon, so that you can prepare for the next year's competition.

We are trying our best to make this the most interesting exhibit at the country fairs. Heretofore the farmers have not been able to do much with exhibits. You all know that at that season of the year the farmers are busy and cannot take time to put in their exhibits. Hence a great many of the farmers do not see the field that has been judged, and often the first prize field will be nine miles in this direction and the second prize field a dozen miles in the opposite direction. We met with considerable opposition from our local fair, but a few weeks ago I was able to recommend that we give prizes for sheaves in that prize crop competition, and make it compulsory that those farmers who entered the competition should exhibit at the local fairs. I think that will have an educational value for the farmers. A farmer may win first prize on the Field Crop Competition, but may stand ninth in the show. He will wonder why he did not win, and the next year I am sure his exhibit will be better.

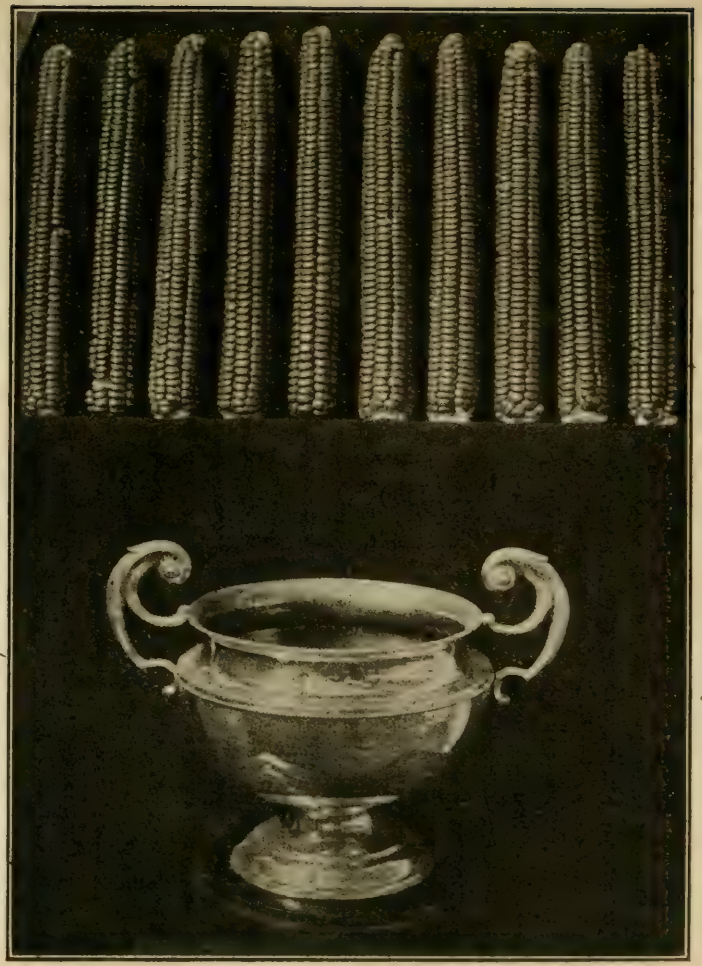
THE JUNIOR WORK OF THE DEPARTMENT OF AGRICULTURE.

J. L. Dougherty, District Representative, Chatham.

I am sure you will agree with me that this embraces one of the greatest, if not the greatest, subjects which could be discussed from any public platform. In that we have the privilege of working with the boys and girls of the rural sections of Ontario. During the past few days we have heard from this platform many people discussing the production of corn, corn as a feed, the selection of seed corn,



Champion five ears in Junior Class. Winner, Stephen Newman, Cottam.



Champion ten ears of Flint corn. Winner L. D. Hankinson, Aylmer.

and many other important subjects, but after all, we have to revert back to man. After all it is the man behind the gun that counts. It is the men and women of the future, who are the boys and girls of to-day. From that standpoint I consider that I have the greatest subject that can be discussed from any platform.

The former speaker spoke to you about the Field Crop Competitions carried on in Ontario, under the Ontario Fairs Association, and the Field Crop Competitions are doing a wonderful work and producing wonderful results, and I am sure that from the boys and girls of to-day we can develop men and women who will be able to over-shadow all the results which have been attained by the men of the present day, in these competitions.

How shall we do it? First, I would say by the work which we are doing in connection with our Rural School Fairs. I know you have all heard of the School Fairs, but probably you have not thought of them in this particular way. You do not know to what an extent the School Fairs are working in the Province of Ontario. In 1912—just to give you a little of the history of the development of the School Fairs—the Ontario Department of Agriculture took up the subject of School Fairs and in that year had twelve school fairs; in 1915 they had two hundred and thirty-four, comprising two thousand and twenty-nine schools, practically one-half the rural schools in Ontario. That took in about 48,386 pupils growing corn and vegetables. Six thousand eight hundred and sixty-eight settings of eggs were distributed, aggregating 75,000 eggs, mostly Barred Rock eggs. At these School Fairs there was an attendance of 72,000 children and 84,000 adults.

Every winter in the counties where there is a District Representative he conducts a short course of from four to six weeks for the young men, and after that course is over, if the young men wish it, they organize a Junior Farmers' Improvement Association. The purpose of this is to keep them in touch with the Department, and by holding meetings once a week or once a month, as they wish, they may discuss problems which are of interest to themselves and also conduct debates and other things of educational value.

The Acre Crop Competition which the Department of Agriculture had introduced for the younger men, and the competitions in hog growing, have been a means of stimulating the interest of the younger farmers in producing better crops and better animals.

The last couple of years the Department has introduced a scheme whereby they will supply the young men taking the course with a book and give them instructions in keeping an accounting system. It is generally recognized at the present day that the farmer does not apply business principles to his work, and in fact, the man who does not take into account the cost of producing certain crops, the cost of producing certain animals, and knows where he stands in the cost of production, will not be a leader. It is the net profits we are after, and if we do not keep a cost account system we never will know where we are at. I believe that the Department is doing a splendid work in giving four of these books to the young men who attend the course.

Mr. Dougherty advised the young men to take the short courses whenever possible, and closed his remarks with the hope that the Corn Growers' Association would have a splendid and prosperous year in 1917.

PRESIDENT'S ADDRESS.

Robert W. Knister, Comber.

I desire to thank you and all the citizens of Kingsville, especially the Board of Trade and the fathers of the town, if I may use that term, for inviting the Corn Growers to your town.

I had thought that we ought to bring the Corn Show back to Essex County. It was originated here, and has always received liberal grants from the County Council. But though our convention requires adequate accommodation and convenient location, what is most indispensable is the good-will of the people of the town or city in which the show is held. That alone can ensure its success.

We are assured of one fact in regard to this gathering of corn growers. I say "Corn Growers" because we bear that name—although I do not like the idea of being confined solely to any one crop, for if we grew corn only we would not come out very well. We believe that we have held each year a convention which has undoubtedly been of the highest value to all who attended it. For it seems to me that listening to the best speakers which Canada and the United States afford, we can surely gather some new ideas and put them into practice and thereby benefit not only ourselves but our relations to the country generally.

You will all agree with me, and every person realizes, though some to a greater extent than others, that there was never a time in the history of the world when each person had the idea before him of the need to work for the benefit of his country to such an extent as at present. We are not working to-day for one nation alone, but for the saving of the Allies in this terrific struggle. If it were not for what co-operation exists, in what a state the affairs of the world would be to-day! It appears to me that a great change has come over our people lately. There is an almost unanimous idea of working together and that is a long step towards revolutionizing conditions. If we are to make the highest progress we must be of one accord, we must see each other as eye to eye, we must understand each other. Especially must the people in the cities understand the country people better than they do at present. They have their problems and we have ours.

One of their problems at the present time is the high cost of living. That cannot fail to be of interest, and never more than it is at the present time. And we are told that matters will be worse before they are better. I sometimes think that if the people of the cities could be shown just how the high prices were brought about that we could see eye to eye.

I was talking to a townsman to-day, and he was asking me questions, and telling me how he tried to grow potatoes on a vacant lot, how he put them in and expected a large crop. Of course we farmers would have done the same, but we were not sure of getting that crop, we just live on faith. We cannot put them in the ground and get an invoice of the crop they will yield. We do not know whether they are going to yield a crop or not, but we know if we have good seed and give proper attention we will probably have a good crop. This man did not get his crop. There was a drought. He was dealing with the forces of nature; but so were thousands of farmers all over the country. I believe that if more city people made attempts like this they would not blame the farmer when the prices of home-grown foodstuffs go up.

Of course the farmer will get along best if he is well posted in every branch of his work. A farmer who is a poor stock raiser or fruit grower may possibly be a good corn grower. He may not have had an opportunity of learning about

scientific stock raising or fruit growing. But in whatever line he engages he must be a specialist in it to make a success of it.

I think we farmers would have a chance to benefit ourselves if we took time to stop and think. But we don't have time for that now, especially since we have no help on the farms. I notice that one county council, making a review of the county, found that there was an average of one man to every hundred acres. Now we surely cannot do things as they should be done under this handicap.

There are some men in the towns who are doing nothing, and I feel that at this time even the retired farmers should turn out and help.

I am pleased with the progress of the show, and with the enjoyable and profitable time we are having. We have yet to get the full benefit from the convention; we have the best speakers to follow. Let us join in giving them our heartiest support.

ADDRESS.

DR. CREELMAN, PRESIDENT O. A. C., GUELPH.

I wish to thank the Chairman for introducing me to you as the new Commissioner of Agriculture for the Province of Ontario. But I want to tell you that doesn't mean anything at all unless I get busy and do something for the farmers of Ontario, and unless the farmers of Ontario get busy and give me something to do. Unless we get together it is only multiplying the duties of the Minister of Agriculture to get a job for another person.

At this juncture, with the depreciating number of students in the College, which left me with more time at my disposal, and because we didn't want to multiply offices, when everybody is, at this time doing his bit at home or abroad, it was more or less a combination on my part that I have been asked to advise the Premier in regard to legislation in this connection.

In relation to this, provision has been made that I shall keep my place in the Agricultural College, but that I shall go to Toronto as often as possible. I shall advise the new Minister, who is also the Premier, to the best of my ability; that is my work, as far as I can define the commission.

Now, I want to compliment the people of Western Ontario on their action in keeping up this work from year to year and keeping up the excellence of the exhibits. I might say I was favorably disappointed. Anybody who lived through last spring, who saw it rain day after day and night after night, on the just as well as on the unjust, all through April, all through May and on through June, and then saw it come on so hot that those of us who were not as good as we might have been, did not believe that anybody could make it hotter for us here or hereafter, saw the earth parched and dry, did not expect much of a crop. But, notwithstanding these two conditions, we have a very creditable crop, a very creditable exhibit, and I am pleased to pay tribute to it after going over it myself and with the other judges of the fair. And we are looking for very much bigger things from you next year and in the years to come.

May I just say in this connection, that while the men in the west are a great power in the land, I may say that the farmers in Southwestern Ontario might compete with them in that connection by the building up of a corn show, the like of which has never been seen in Canada, and by the means of competition each man

would endeavor to make a name for himself such that the buyers would come directly to him rather than to wait for him to come to them.

The small grain dealer like the small cattle dealer cannot get the same price that he could get through the proper organization of producers. You are good farmers, every one of you, and you are thinkers or you wouldn't be here. Farm help is scarce, but you are still here, and you are here to learn what is best for you to do under those circumstances. I say we need co-operation, the best we can have, for those who are studying Agriculture as you are, that you can raise as much grain, as good grain as can be grown in the whole of Ontario.

The Premier of Ontario is now Minister of Agriculture. We have never before had a Premier in the Province of Ontario who was Minister of Agriculture and Premier at the same time. But we have come to realize the importance of the farming industry. We are in a position to spend more money in the business of farming. We have more people engaged in the farming business now than ever before, and they need proper representation. Heretofore they were asked to vote this way and that way by every Tom, Dick and Harry offering influence and support to them. Possibly some grant was made, but the lawyers stepped in and the farmers did not get anything out of it. Now the time has come when the Premier has said that farming is the most important business from the standpoint of everybody in the Province of Ontario, that Canada would be bankrupt but for the farmers, and that the farmers needed the support of the Government. So he said he thought he could reorganize them and decided to take the portfolio of Minister of Agriculture himself. And he said (I am speaking for him, as if he were talking, now), "I will ask Dr. Creelman to come down and help me. With Dr. Creelman's advice, I will reorganize the people as well as I can." So he sent for me, and I went down to see him, and he said to me, "Now, we want to do what is best for the farmers. If you know of some measure that will benefit them, put it before the Legislature and we will fix it up." I said, "What about corn?" "Corn?" he asked. "Yes," I said, "the farmers in Southwestern Ontario need some assistance. Why, the whole of Ontario is practically dependent upon them for their seed." "How many of our farmers are depending upon the southwest for their seed?" "Well, I cannot say that but I do know that agents are coming in from the United States and selling inferior seed to what could be bought here. I know of good farmers who had to feed good seed corn to their hogs because they couldn't get a decent price for it."

"The farmers have corn shows every year in Southwestern Ontario, and they have a Corn Growers' Association down there. I know that because they have changed their secretary four times at least, to my own knowledge. I remember Mr. McKenny, Mr. Edwards, Mr. Smith, and Mr. Noble. And these men have arranged shows that are bigger and better every year.

"I want you to let me go to Kingsville and announce to the people there that you will allow me to nominate a man who will stay down there and undertake the inspection of corn from every district and township, visit every farm and help the farmers. And let the Government pay for the job."

"And he said, 'All right.'" (Applause.)

Now I have made the announcement, and we can go on to something else. I have such a man in mind, or rather two or three men fitted for the place, and I hope to see him settled so you can use him for the purposes I have stated. I want him to be on every man's farm sooner or later. I want him to find out who are the honest men who are trying to make a better product, and then I want him to go

east and tell the people where you are. The man who is producing good corn should get good prices for his corn, because of the extra price he pays for his seed, the extra time he spends on his crop, the extra amount of manure and summer fallow he uses, and I want him to get it.

And when the seed fairs are being held in Guelph and Markham and Brockville, I want the man to be able to say to the farmers down there, "I know John Smith down in such and such a township, and he has just what you want, first-class seed in every respect." And I want that man further to say for you that Canadian corn is good enough for Canadians. (Applause.) And that the corn raised north of the line, under the same climatic conditions is better seed. When that is arrived at we will have co-operation, and two associations, one in the east and one in the west working in unity. That is the situation and that is what we want.

Now I want to say some things generally that you may not all be interested in. I want to congratulate you on the crops you have had. They were much better crops than we hoped to have. The statistics for Ontario are not showing up badly. Of course the hay crop was unusual. If you stop to think you will remember at least those of you whose hair is white, will remember that there was a time when if you had good clover hay for stock in winter time, without any corn crop, you were satisfied. If the farmers on account of a good hay crop were able to keep their good females over anyway, and not sacrifice them to the butcher, and have a few calves and pigs and lambs, they were well satisfied.

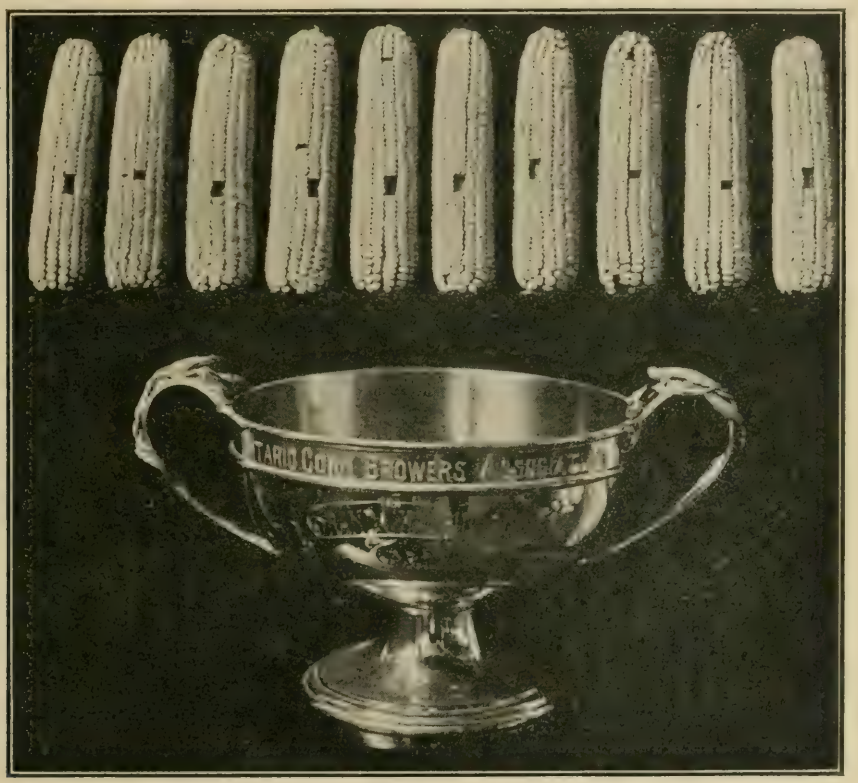
And then our statistics are coming in on the milk, butter, cheese and honey productions. During the early months the cattle came in very well, but it was pretty well through the dry weather before they were materially affected. The most of the cows went off on the amount of milk but on account of the increased price of cheese, milk and butter, the men who are in the dairy business were well satisfied with their profits. But, I must say that the best farmers, those who had their farms tile-drained as well as they could afford, and those who had cultivated between the showers, and those who got their crops in between the rains, and those who did work well, have all made money on their farms this year.

Now some people say, "It is all very well for you, who are paid by the Government, to get up and tell us how to make money, when we fellows who have to put our backs to the plough, cannot make it." They say, "You have to have a large variety of corn and breeds of cattle to make a success of it." That's all very well, but those fellows who stuck to one breed of sheep, hogs and cattle and managed to keep them through the wet season and through the drought, in the end made the money. The man who sticks to one breed of cattle or one variety of corn is the one who is going to make good at farming. That fact was shown up better this year than any other year. The good farmer made good, the poor farmer failed. It takes patience, perseverance, and understanding in the farmer, and his whole attention to make good, and so it should be an encouragement to keep our farms up to the best state of tilth, to the highest state of cultivation, that we may secure the best productions in the largest quantities.

In these days we hear so much about the high cost of living. The city people are always yelling out for the farmers to produce more. Now that makes me tired. Talking to the people who are working all the time, with the utmost vigor all the time, to produce the usual amount of farm products and handicapped with the least possible amount of help. They say that the farmer could do his bit for the country if he would get down to work. Well, I say the farmer who doesn't do his very best to keep things going as usual should be talked to, but the farmer who is putting his whole time and attention to the growing of his crop, has been doing

the best he can, and the man who is talking about production is the one who is on the wrong end of the ticket. If he is prepared to go out on the farm during his summer vacation and work, it is all right, but he won't.

I often have city people come to me asking such questions. One of these men recently came to me in Toronto, saying, "Why don't the farmers produce more? Why don't they work?" And I said, "Why don't you work?" And he said, "Why?" I said, "Why don't you work. Tell me this, what do you have to pay for your vegetables for a year?" "I don't know," he said, "That's my wife's job." I said, "Well, ask her. Call her up and ask her." One of them did call his wife up, and they figured out so much for potatoes and so much for their vege-



Champion ten ears of Dent corn. Winner, Walkerside Farm, Walkerville.

tables, in all about one hundred and fifty dollars. And I said, "Why don't you raise your own vegetables?" "Me?" he gasped. "Yes, you." "I can't," he said. "You say you were raised on a farm?" "Yes." "Well, why don't you raise your own vegetables?" "Me?" he asked again. "You've said 'Me' three times, now. You come in to advise me about increasing production. How much land have you?" "A little backyard." "How big?" "About fifty feet square." "Well that would grow a lot of vegetables." "Would it?" he said. "Yes, and if every backyard in the city of Toronto was cultivated even ten feet square, enough vegetables would be grown to supply all the families. There are about five hundred thousand people living in Toronto, and nearly every one of them has a backyard. They have to have a way out, so to speak. If you only had a plot forty or fifty feet square you could grow all your vegetables. You could grow your peas and beans by the door, and your celery and carrots, and beets and lettuce, and your

tomatoes against the fence." "Well, how would that help the empire?" he asked. "Well," I said, "if you can produce these stuffs for your own use that would let the other fellow spend his time on growing the big products, the field crops. And," I said, "we are going to talk and write this up in the newspapers and say, 'A garden for every family in 1917.' Every person in the Province of Ontario could produce at least twenty-five dollars worth of stuff, and that multiplied by the number of people in the Province would make millions of dollars saved for the Government."

Now I would like to see some things done at an early date, things that the farmers can do for themselves, largely. I would like to see a mile of good roads each year in every township. (Applause.) I believe that we need instruction for our farmers' sons and daughters along lines of scientific farming. (Applause.) No, we can't teach any person, but one who has some knowledge of farming, the farmers' sons are the ones we want. So the boy who comes to us with a good common farm education, with the best knowledge that his father had and comes to us and finds out about the best breeds of sheep and has a breed of sheep at home to compare them with, and the same with cows, can get something out of the College. He goes home with the idea that now, with his father's experience and the help of the Agricultural Representative that the Government has there for his assistance, he can use his own brains to better his farm. That is all the Agricultural College can do for him, make him think. And with a mile more of good roads in every township each year conditions would soon be better. It is all very well for us old fellows to talk about progress, but we cannot do it all. Our best days are over. Here are these eight boys before me, come to the meeting with sticks in their hands. I suppose they are farmers' sons. At any rate they were interested enough to come to listen to this talk. It isn't fair to take a boy and make a man of him too soon, but every boy should realize his opportunities. Now, I would like to say that the boy going to school with the idea that he is going to get something out of it every day, that he was going to know something more about farming every day, will succeed.

I think that the teaching in our country schools should lead to proper living in the country. Of course some will slip away to the cities, but I think it would be more useful to the boy to be trained towards farm life than what is being done towards fitting him for matriculation. Train him for the thing at hand.

I say we might do that. It is all very well to give him book instruction, but every farmer's boy of to-day should be a good judge of corn before he is fourteen years of age. Such a course could be put in place of many of the subjects that he is forced to learn, sitting in the seat with his feet hardly touching the floor, and learning something that he will never use. But you say the Educational Department should attend to that. I have talked with many educational experts from Dr. Pyne down, and they all say that they are willing to take the matter up as soon as the people show a desire to have something done along that line.

You can make the schools what you want them to be. If you want better schools you can have them. I would like to see that every school teacher who goes to your schools has had a course in the Agricultural College. Our College is open all the year round, and we had over two hundred teachers there during the summer holidays last year. We don't want them to think that they have to teach farming, but we want them to know about the corn and the grains that are raised and consumed. There is no reason why every teacher shouldn't have that training.

And there is no reason why every school shouldn't have a school garden. It rouses an interest in the pupils. And, let me say that the teacher can only do a certain amount. The teacher has nothing to do with planting first-class Canadian

trees around the schools. The trustees are responsible for that. I would like all school grounds to be beauty spots. The school grounds were more beautiful before we cut the old forest trees down. I would like to see the children, before they study about the Kamschatka, Dwina and Neva and the other rivers of Europe, and about Manchuria and China, and what a relative pronoun is, know about the things around them. I learned all that before I knew the difference between a blue jay and a swallow. I learned that before I knew the common grains, the common flowers and the weeds that we were getting in from the eastern Provinces, and I did not know anything about stopping them then and they have run all over the farm since. The boys and girls are still permitted to go along that way, and they do not know the names of the stars over their heads or how the soil under their feet was made, and the grasses they are tramping upon, and upon which they are to spend the rest of their days.

The young boys in Switzerland, Sweden and Norway know all these things before they are out of their teens. They are taught all about what is in the township, in their community, before they learn about the outside world. And our boys and our men are woefully ignorant of these things, and if they do know—and it is only an odd fellow in the vicinity who does—you cannot talk to him because you do not know anything about the things he has read and knows about. Let us know about the things that are common in our conversation—the beasts and flowers of the field. In the first place, it is educational, and in the second place it is economical. It is good citizenship to have a man know these things.

If he knows birds he knows those which are injurious and he kills these, and if he knows those which are good for eating injurious weed seeds and grubs, then he will allow them to live and encourage them on his farm. I wish I could go down and slap Mr. Jack Miner on the back, and to thank him for the work he has done. I wish they had a bird sign on every tree. "Don't kill the birds." I wish every boy and girl could come here and see his bird houses, and reserves for the wild fowl. I can imagine the boys and girls going home and saying, "Father, why can't we grow more trees here so the birds would come and live in them, and couldn't we have a little house for the birds to live in?" It would be a great and lasting good to the country.

Now, I leave these things with you. And don't tell me: "It's all very well, but the Government and the Agricultural College won't help us." We have all kinds of books and pamphlets for you to read if you will only ask for them, on all branches of agriculture and stock raising. Ask for them.

Then I want you to prepare for the electric power. The farmer of to-day is a business man. He is dependent on nobody now. I can remember when I used to come to town with my father, and how he would grasp me by the hand and take me into the bank with him. Father always went in a kind of apologetically, and I slunk along behind him, for I wanted to see the animals in the cage. The banker came out and gruffly asked what we wanted. My father said he wanted to deposit some money. Father said it very apologetically, as if he were asking a favor. The banker's manner was pompous and lofty. I do not know what that banker would have looked like if father had wanted to borrow money instead of deposit it. He said, "Can you make out the deposit slip or do you want someone to fix it for you?" Now that was an insinuation of ignorance in my father. My father was a well read man. But there was such a distance between the men. Now, that won't go any more in these days with eggs at five cents apiece, corn at $1, wheat nearly $2 and hogs at 9½c. live weight. You do not need to take your hat off to anyone anymore. And those prices will never go back to the old prices we used to get, but you will have to be sure that you have got the goods to sell.

Eggs bring in sixty cents a dozen now. We have Rock eggs in Guelph for breeding that we sell for ten cents apiece. I had an egg in Kingsville yesterday that I was told cost five cents. At that rate hens should be profitable. You say that that's the old woman's job; that she looks after the chickens, and what she gets from them is her money. And at that they have to roost on the old cutter. (Laughter.) That's playing at the game. I want the farmers to do a lot of thinking. Maybe thinking of corn will lead them into chickens, and maybe chickens will lead them into sheep. That will all profit you something. The hen that lays eggs for fifteen days in succession and then quits and goes and sets on them, at the very time that eggs are high, isn't going to do you any good. You must have hens laying when prices are high. You may have to hatch them early in the season and keep them down in the cellar and leave one of the children to watch them, but even if you pay him you will be gaining in the end, for you have interested him in chickens. Why, if he leaves you at twenty years you will have lost him, the best help that you could get. Get him interested in the farm and let him take his share of its responsibility.

They tell me you can dig a hole any place in Ontario and strike water. And they tell me that if you just let down a pipe you can tap it in the house. With a few attachments the girls can get both hot and cold water from the tap in your own farmhouse, and the mother, too, who is getting older, now, doesn't need to go out and bring in snow to get water to heat for the baths. That is a seemingly common thing, water, but the good God gave it to us and when are we fellows going to understand that running water is a necessity. We should have water in our farm houses. I do not know, but I think it would be worth while to find out what it would cost to put in a bathroom and windmill and tank, and I don't know but what it would be a good idea to send out notices to the farmers saying, you can have hot water and a bathroom in your house for so much. I think it will be money well spent at any rate, for I don't think our girls would be going to work in towns for $3.50 a week, if they could have everything handy and hot water in the tap.

Now, co-operation. We have established a department, with Mr. Hart in charge. In the speech from the throne, which you may have noticed in the papers, there was mention made with regard to the Agricultural Association whereby the farmers could have co-operation, where they may get their heads together and do those things that they can do in their communities which they cannot do without the community spirit, and break up the petty jealousies that are so prevalent. There was a co-operative corporation in connection with the fruit growers in Niagara. The agents offered to sell the apples for the growers at a commission of 25c. a barrel. And, while they secured a better market for the apples, and the farmers got $1.25 more for their apples per barrel than they could have gotten themselves, they begrudged the commission. They did not understand the value of co-operation.

Of course there are some co-operative combinations which we call trusts which are not beneficial to the producers, but I think we have not many in this country.

Then let us get rid of these petty jealousies and let us all get together. If we ever get together in the Province of Ontario from Essex to Glengarry, and get together for the improvement of the churches, for the improvement of the schools, for the improvement of the men, women and children, the church, the school, and the people as a community centre will rise up in their might and enjoy prosperity. If we live through to that time we will live to enjoy the clear blue sky and the good ground, and reap the joys of prosperity. When that time comes I hope still to be Commissioner of Agriculture.

TWELFTH ANNUAL REPORT

OF THE

ONTARIO

Vegetable Growers' Association

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:

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1917

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Corner Queen and John Streets
TORONTO

To His Honour, SIR JOHN STRATHEARN HENDRIE, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I hereby present for the consideration of Your Honour the Annual Report of the Ontario Vegetable Growers' Association for 1916.

Respectfully Yours,

W. H. HEARST,
Minister of Agriculture.

TORONTO, 1917.

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ONTARIO VEGETABLE GROWERS' ASSOCIATION

Officers and Directors 1917

President: J. J. DAVIS, London, R. R. 7.

First Vice-President: E. K. PURDY, Kingston.

Second Vice-President: MAURICE MAY, Tecumseh.

Secretary-Treasurer: J. LOCKIE WILSON, Toronto.

Directors: THOS. DELWORTH, Weston; L. JOHNS, Belleville; WM. GUTHRIE, Sarnia; H. HACHBORN, Brantford, R.R. 5; W. S. EBORALL, Beamsville; ERNEST COOKE, Cataraqui; R. DENGATE, Ealing; H. L. BAILIE, Billings Bridge; WM. COLLINS, St. Thomas, R. R. 4; J. W. SMITH, Sarnia, R. R. 1; C. GUTHRIE, Stratford; A. NELSON, Fonthill.

Executive: J. J. DAVIS, E. K. PURDY, THOS. DELWORTH, MAURICE MAY, F. F. REEVES, and J. LOCKIE WILSON.

Representative to Canadian National Exhibition: JAS. DANDRIDGE, Humber Bay.

Representatives to Central Canada Exhibition: J. J. DAVIS and H. L. BAILIE, Billings Bridge.

J. J. Davis, President,
Ontario Vegetable Growers' Association.

Ontario Vegetable Growers' Association

TWELFTH ANNUAL CONVENTION.

The annual convention of the Ontario Vegetable Growers' Association was held in the Parliament Buildings, Toronto, on Friday, November 24th, 1916. All sections of the Province were represented.

PRESIDENT'S ADDRESS.

F. F. Reeves, Humber Bay.

It is a pleasure to welcome you to the Twelfth Annual Convention of the Ontario Vegetable Growers' Association. I am glad to see such a large representation from the various branches here to-day. From year to year interest increases in our conventions, and it gives me a feeling of satisfaction to know that the programme which will be presented here to-day is even better than has been arranged on previous occasions. A free discussion of the many phases of vegetable work will stimulate interest in the various addresses.

The work of the Association has been carried on during the past year to the best possible advantage. Our membership is increasing annually and more interest is being aroused at Vegetable Growers' Meetings than in the earlier years of our history. The field crop-competitions continue to be one of the features of our Association's work. At a meeting of the directors it was recommended that a competition be held and prizes offered for the best kept gardens in the various districts of the Province. As the arrangements concerning this particular competition become perfected, I believe that more interest will be taken in this than in the individual crop competitions.

The arrangement of the displays of vegetables from our competitions improves yearly and at Toronto, London and Ottawa Exhibitions they attracted considerable attention.

It was with deep regret that we learned of the sudden death of the Hon. Jas. Duff, late Minister for Agriculture. Mr. Duff has on more than one occasion been with us at our conventions and has been pleased to help us in many ways. Much of the Government work in the interests of farmers, fruit and vegetable growers has been carried on during Mr. Duff's term of office, and I feel that the Province of Ontario in general and all agriculturists owe a very great deal to the help and advice so kindly given by our late Minister.

There are several suggestions which I would like to bring before this Convention on matters relating to our industry, and I trust that they may be given serious consideration by our members not only present but also those at home after reading our Annual Report.

Canada as well as all countries affected by the great European conflict must prepare herself for the return of her valiant sons who have fought on the blood-stained fields of France and Flanders in the cause of justice and right. Of these men, many, unfortunately, will not be able to engage in strenuous indoor work and

they must needs turn to some form of agriculture as a means of livelihood, and because, as all people know, vegetable growing can be carried on successfully on a small acreage of land quite close to the various towns and cities, work will, doubtless, be secured for many of them in this healthful work.

It is a well known fact that the soldiers who have already returned are not anxious to go on to the farms any very great distance from a city or town. This is but natural, after these men have had the experience of being in the large centres for some length of time before and after going to France. It is my opinion that many of our returning soldiers would be inclined to take up vegetable growing as a business.

At the present time we occasionally hear of a returned hero inquiring as to how he can secure a small tract of land on which he can start gardening. Many of these men have personally been on the wonderful gardens of France and England where one acre efficiently handled gives as much monetary return annually as 100 acres of choice farm land in this country.

At this meeting of the Ontario Vegetable Growers' Association would it not be fit and proper to place ourselves on record that we, as an Association, are anxious and willing to give any assistance to returned soldiers in our power, and that we also, as an Association, make representation to the Department of Agriculture of this Province that work be undertaken to gather careful and concise statistics regarding our industry, and also that these statistics and other valuable data be prepared so as to give our Canadian heroes a chance to turn to the business of growing vegetables as one promising good financial returns, if properly handled, after having gone carefully into the information provided. I consider this work should be done before the return of our soldiers rather than after.

RESOLUTION REGARDING THE VEGETABLE INDUSTRY AND RETURNED SOLDIERS.

"It was moved and seconded that the Department of Agriculture be requested to collect statistics and data of the vegetable growing industry throughout the Province as promptly as possible, so that they may be available when required for the benefit of returned soldiers." Carried.

REPORT OF THE SECRETARY-TREASURER.

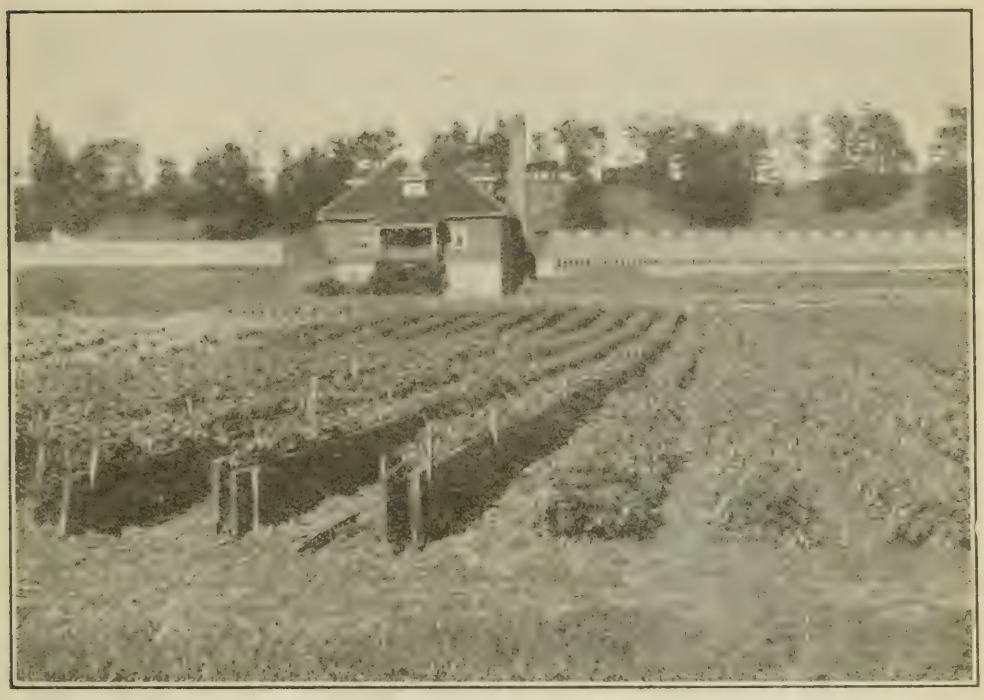
J. Lockie Wilson, Toronto.

The members of the Ontario Vegetable Growers' Association have much to be thankful for in the year which has just closed. Notwithstanding the fact that nearly every member of our Association has a son or brother fighting in the fields of France or Flanders, our people have been able, by putting forth an extra effort, to plant and harvest their crops, for which, though not very heavy, prevailing prices were reasonably remunerative. Early potatoes were a light crop and celery in many places a complete failure.

The most successful meetings in 1916 were those held at the homes of gardeners in the different sections of the Province. Every branch of this Association should have these home gatherings where the practical demonstration of

successful growers can be taken advantage of. Apart altogether from the value of these meetings from a financial point of view, the social side must also be considered where men and women engaged in the same business can and should fraternize and enjoy each other's hospitality. In this connection co-operation is encouraged and faith in each other engendered.

Through the efforts of some of our Toronto citizens a market has been opened in the north part of this city, which has proved a great convenience to our market gardeners as well as to the heads of families in that section of the city.



Celery garden, near Lambton, showing part of crop boarded up for bleaching.

Vegetable Exhibits at Fairs and Exhibitions.

At the Canadian National this year the general vegetable exhibits were badly staged and allowed to remain on the tables after they had begun to decay. I understand that the Board of the Canadian National required that vegetables on exhibition be renewed from time to time. This rule was a proper one if the prize lists were increased to meet this extra expense on the part of the vegetable exhibitor. This the directors did not do; consequently, the exhibits were allowed to decay on the tables, and reflected little credit on the directors and exhibitors. Definite arrangements should be made so that all the perishable exhibits be renewed from day to day. This would mean, of course, additional expense, and the directors of the Canadian National should provide for same.

The Ontario Vegetable Field Crop Competitions this year were a marked success and the exhibits of potatoes, tomatoes, onions and celery (with the exception of the latter) at Toronto, Ottawa and London were the best since these competitions were inaugurated. All decayed vegetation was promptly renewed and replaced by bright, fresh material.

The following are the prize winners:

CANADIAN NATIONAL EXHIBITION.

POTATOES:
1.—C. H. Aymer, Humber Bay.
2.—F. F. Reeves & Son, Humber Bay.
3.—Chas. Aymer, Humber Bay.
4.—W. E. Crandall, Ingersoll.
5.—G. W. Bycroft, London, R. R. 7.
6.—Fred Somes, Sarnia, R.R. 3.
7.—Thos. Delworth, Weston.

TOMATOES:
1.—C. H. Aymer, Humber Bay.
2.—Tizzard Bros., Humber Bay.
3.—Edgar Worgan, Weston, R.R. 1.
4.—Thos. Delworth, Weston.
5.—W. R. Trott, London West.
6.—Chas. Aymer, Humber Bay.
7.—Victor Robinet, Tecumseh.

ONIONS:
1.—Chas. Aymer, Humber Bay.
2.—W. E. Crandall, Ingersoll.
3.—F. F. Reeves & Son, Humber Bay.
4.—Jas. Cox, Cummings Bridge.
5.—W. S. Eborall, Beamsville, R.R. 1.
6.—J. Harris & Son, Belleville.
7.—Edgar Worgan, Weston, R.R. 1.

CELERY:
1.—C. E. Post, Brighton, R.R. 1.
2.—J. J. Davis, London, R.R. 7.
3.—W. R. Trott, London West.
4.—J. Harris & Son, Belleville.
5.—N. Sanderson, London, R.R. 7.
6.—R. H. Tier, Islington.
7.—P. A. Bell, Humber Bay.

CENTRAL CANADA EXHIBITION.

POTATOES:
1.—R. Plunkett & Sons, Weston.
2.—F. F. Reeves & Son, Humber Bay.
3.—G. W. Bycroft, London, R.R. 7.
4.—C. H. Aymer, Humber Bay.
5.—E. F. Montgomery, St. Williams.
6.—W. E. Crandall, Ingersoll.
7.—Thos. Delworth, Weston.

TOMATOES:
1.—Thos. Delworth, Weston.
2.—Chas. Aymer, Humber Bay.
3.—C. H. Aymer, Humber Bay.
4.—W. R. Trott, London West.
5.—Edgar Worgan, Weston.
6.—W. H. Stewart, Aylmer East.
7.—E. K. Purdy, Cataraqui.

ONIONS:
1.—F. F. Reeves, Humber Bay.
2.—Geo. Riley, Aylmer East.
3.—Chas. Aymer, Humber Bay.
4.—W. E. Crandall, Ingersoll.
5.—Thos. Barwell, Fenwick.
6.—W. S. Eborall, Beamsville.
7.—J. Harris & Son, Belleville.

CELERY:
1.—J. Harris & Son, Belleville.
2.—J. J. Davis, London, R.R. 7.
3.—W. R. Trott, London West.
4.—C. E. Post, Brighton, R.R. 4.
5.—Fuller Bros., London, R.R. 7.
6.—Chas. Aymer, Humber Bay.
7.—R. H. Tier, Islington.

WESTERN FAIR.

POTATOES:
1.—C. Aymer, Humber Bay.
2.—C. H. Aymer, Humber Bay.
3.—F. F. Reeves & Son, Humber Bay.
4.—Geo. Bycroft, London, R.R. 7.
5.—N. Sanderson, London.

TOMATOES:
1.—C. H. Aymer, Humber Bay.
2.—C. Aymer, Humber Bay.
3.—E. Worgan, Weston.
4.—W. R. Trott, London.
5.—Thos. Delworth, Weston.

ONIONS:
1.—F. F. Reeves & Son, Humber Bay.
2.—C. Aymer, Humber Bay.
3.—R. Dengate, Ealing.
4.—W. S. Eborall, Beamsville.
5.—J. Harris & Son, Belleville.

CELERY:
1.—J. J. Davis, London, R. R. 7.
2.—W. R. Trott, London West.
3.—J. Harris & Son, Belleville.
4.—C. E. Post, Brighton, R.R. 4.
5.—R. H. Tier, Islington.

GARDEN COMPETITION.

Our Association this year organized a Garden Competition which proved very successful. The following are the rules and regulations governing same, and I submit them to you so that you may suggest any changes that you think would improve the competition:

1. Each garden must contain not less than 3 acres, but if it contains a greater acreage the whole plot will be judged.

2. Gardens will be judged twice during the season. The first judging will be done not later than July 10 and the second not later than August 10.

3. An entry fee of $1.00 will be charged.

4. The Province will be divided into four districts as follows:

(1) Ottawa, Kingston and Belleville.

(2) Toronto, St. Catharines, Welland, Dunnville, Lincoln and Welland, and Clinton and Louth.

(3) London, St. Thomas, Stratford, Brantford and St. Williams.

(4) Blackwell, Ojibwa, Sarnia and Tecumseh.

5. The following prizes will be offered: 1st, $30; 2nd, $20; 3rd, $10.

6. Entries to be made to the Secretary of the Branch who will forward same to the Secretary of the Central Association.

7. Judges will be supplied free of charge by the Ontario Department of Agriculture.

Some of the benefits derived from these competitions are as follows: (1) Gardeners are encouraged to keep their places in an orderly condition, and greater attention is paid to keeping the rows of vegetables as straight as possible. (2) The crops receive the benefit of increased care and additional cultivation in preparation for the judge's visit. (3) The owner takes a great pride in showing his neighbors and friends what can be done by a little extra work on the part of himself and his hired help. (4) Neighbors who perhaps have been somewhat lax have now more incentive to improve their places because of their member having won a prize and brought honor to that particular locality. This also induces the growing of better crops, quality thus bringing in more money.

PRIZES IN GARDEN COMPETITION.

DISTRICT NO. 1:
1.—Cooke Bros., Cataraqui.
2.—I. A. Farquharson, Aylmer, R. R. 2, Que.
3.—J. Harris & Son, Belleville.

DISTRICT NO. 2:
1.—Thos. Delworth, Weston, R.R. 1.
2.—Art. Carlton, Lambton Mills.
3.—Chas. Aymer, Humber Bay.

DISTRICT NO. 3:
1.—D. A. McInnis, 80 Adelaide Street, London.
2.—P. T. Jean, London, R.R. 8.
3.—G. W. Bycroft, London.

DISTRICT NO. 4:
1.—A. Guthrie, 481 London Rd., Sarnia.
2.—Geo. Bridger, Sarnia, R.R. 1.
3.—C. Wilson, Sarnia, R.R. 3.

GRADING OF VEGETABLES.

There has been a movement on foot during recent years to adopt a standard for all commodities and products. Up to the present only three are legally standardized, viz.: apples, seeds and western green.

The following grading of late potatoes, onions and late and early tomatoes has been suggested:

POTATOES (late: fancy).—One variety, true to type, ripe, sound, smooth, clean, uniform in size and not varying over one inch in diameter, and of at least medium size for the variety. No. 1.—One type of color, ripe, uniform in size, but not over size for the variety, and not under two inches in diameter, smooth, free from irregularities in shape and at least medium depth of eyes, free from earth, free from blemishes caused by insects, diseases, sun scald or by implements, and not more than ten per cent. showing any or all defects. No. 2.—One color, ripe, fairly uniform in size (not less than 1⅞ inches in diameter) fairly free from earth, not more than 30 per cent. scabby and knobby or affected by insects, not more than 5 per cent. affected by blight or rot.

Onions (fancy).—Size 2½ to 3 inches in diameter—quality as in No. 1. No. 1.—Size 1¾ inches and over, uniform size, dry, firm, free from blemish, ripe, free from double onions, dirt, roots, etc. No. 2.—Size 1 inch to 1¾ inches, quality as in No. 1.

Tomatoes (late).—No. 1.—One color, fairly uniform in size, uniform in ripeness, smooth, clean, entirely free from splits, free from blemishes, diseases, insect injury, bruises, stems removed. No. 2.—Culls—fit for food.

Tomatoes (early).—No. 1.—Same description as No. 1 late. No. 2.—All others except decayed, small or blemished.

Nomenclature of Seeds.

In common with market gardeners in different parts of this continent, our vegetable growers are very much dissatisfied with the present system of nomenclature existing in seedsmen's catalogues. There are too many varieties included, and also a named variety in one catalogue is often different from that sold under the same name by another seedsman. The tendency also is to push the sale of so-called novelties, which are described as most desirable, when they are frequently identical with existing named varieties, and sometimes not even as good. It has been charged that seedsmen cater to amateurs who are apt to purchase novelties until, by sad experience, they find that the old-time standards are the best.

In an address to American seedsmen Mr. Durst, whom we have with us to-day, points out the disadvantages of the present system of nomenclature of vegetables as follows: The confusion which exists is nothing more than might be expected when one considers the circumstances under which present nomenclature developed.

As a body of men you are interested in the sale of seed. Your success largely depends on your advertising. Competition is keen and one naturally inclines to take advantage of any feature that might increase sales. Changes now and then are only looked at from the standpoint of increased sales. New varieties are usually good advertisers, and often, on the advice of the originator, they are introduced under new names before there has been time to really determine whether or not they are actually different from, or superior to, existing varieties. The result is a multiplication of names, making it difficult for growers to buy, and lowering confidence in the dealers. Many of the undesirable sorts now catalogued will necessarily die a natural death if allowed to follow the usual course. One change which seems feasible, however, is a shortening of the variety names. Many superfluous adjectives could undoubtedly be dropped. It was found on investigation that Blood Turnip Seed was listed by 140 firms. By the use of different combinations of adjectives, 20 different variations in the name were found, such as Early Blood Turnip, Improved Blood Turnip, Extra Early Blood Red Turnip, etc. Similar conditions exist with other vegetables. Vegetable growers would like to see seedsmen agree upon a common name in such cases. Such action would make it possible for growers to buy the same variety from different seedsmen with a greater degree of certainty.

Another point in existing nomenclature which is certainly worth serious consideration is the use of different names for the same variety. Take the Earliana Tomato, for instance. It is safe to say that this variety is catalogued under at least a dozen different names by various firms.

Another point of greater concern to the growers is the large number of varieties catalogued, not infrequently as high as forty-five or fifty. The large number is due in part to the cataloguing of a variety under more than one name to meet the

demands of different customers, but perhaps it is more largely due to the carrying of inferior sorts. In the end such procedure can not but be a loss to the seed trade as well as to the grower. In most cases it should be possible to reduce the number of varieties to not over ten or twelve. This would not only raise the standards of the seeds sold and crops produced, but it should be a great help to the seedsmen in simplifying their business and in making mistakes far less likely.

The growers would especially emphasize the need of purifying and perfecting existing varieties. Many of our best ones are becoming contaminated through cross pollination with other varieties planted too near. Again, judicious selection seems to have been neglected in some cases, since the type is often quite variable. It is well known that most growers prefer French grown celery seed to American, because of greater care in selection. No doubt American growers would be able to

Good potato crop.

raise as high quality celery seed as the Frenchmen, provided the same methods were used. The keeping of existing varieties in a high state of perfection has, in many cases, been overlooked in the anxiety to introduce new sorts.

As to new introductions seedsmen should satisfy themselves that a proposed new introduction is really superior to existing varieties in some important respects before introducing it.

The members of the Ontario Vegetable Growers' Association, with me, exceedingly regret the sudden death of the Hon. Jas. S. Duff, Minister of Agriculture, particularly coming as it did so soon after the death of his soldier son who fell fighting for the cause which we all have so much at heart. Mr. Duff took a kindly interest in the work of our Association and on many occasions expressed satisfaction at the work that was being accomplished. Our heartfelt sympathy goes out to his sorely bereaved widow and family.

All things considered the work of the Ontario Vegetable Growers' Association has been very satisfactory during 1916, and I congratulate the officers and directors on their successful efforts to bring this organization to a high state of efficiency. Immediately after the close of this war, which we hope will be soon, it is the intention of the officers and directors to inaugurate an energetic campaign to establish new branches and largely increase the membership.

FINANCIAL STATEMENT.

November 30th, 1915, to November 30th, 1916.

Receipts.

Balance on hand from 1915	$523 30	
Grant	800 00	
Membership fees	76 90	
Entry fees for Field Crop Competition	146 00	
Entry fees for Garden Competition	35 00	
		$1,581 20

Expenditure.

Advertising Convention, 1915	$2 16	
Badges for Convention, 1915	2 40	
Auditing	5 00	
Directors expenses to meetings	21 70	
Postage	20 00	
Expenses of speaker to St. Catharines meeting	9 15	
Cut for stationery	15 00	
Stationery	20 00	
Boxes for vegetable exhibits	17 21	
Express on boxes	8 05	
Stenographic services	15 00	
Prizes paid in Garden Competition	240 00	
Prizes paid in Field Crop Competition	330 00	
Executive meetings, services and expenses	87 00	
Services and expenses at 1916 Convention	13 00	
Balance on hand	775 53	
		$1,581 20

Audited and found correct,
(Sgd.) D. H. MacLennan,
Auditor.

J. Tizzard: There are several points in the Secretary's report which I should like to take up. I don't think we can produce celery seed in America as good as the French seed, because the climate is not as favorable. They can grow good onion seed in England, but when you try to reproduce it here it is not satisfactory, due, as above stated, to climatic conditions.

J. J. Davis: In regard to renewal of exhibits at the fairs it seems to me it will involve considerable time and expense for those living a distance away to keep their exhibits fresh. The prizes as given by the fair, while they about pay the exhibitors for their care and trouble are not adequate to cover the cost of renewal. I would rather not exhibit at all than be compelled to remove my exhibits and keep them fresh. We cannot very well undertake to do this. It is very nice to have fresh stuff there for the duration of the fair, but for all that we make out of it we are not paid for any more than sufficient to pay us for selecting and bringing our stuff to the fair the first time.

THE CHAIRMAN: Mr. Wilson's report did not mean the Field Crop exhibits; it is the general vegetable exhibit at Toronto Exhibition. Mr. Wilson has said that one of the rules of the Canadian National Exhibition is that the exhibitor must keep his vegetables fresh during the exhibition. I and some of the others went to the manager of the Toronto Exhibition and asked if they intended to enforce that rule. He answered in the affirmative. I said, "Then I will not exhibit." Afterwards when they saw the entries were not coming in as well as they expected they said they were not going to enforce that rule at all. It seems to me it is up to the Exhibition Association to do one thing or the other. Either make the prizes good enough or cancel that ruling or do as we have recommended to them before, have the vegetable exhibit for only one week out of two.

J. TIZZARD: I think something should be done to keep the vegetable show up that we have at the Toronto Exhibition. The vegetables that are put in the first week look very bad the second. Thousands of people come from the United States and see the vegetables, and if they are not in proper condition it gives the place a bad name. Something should be done so that they can be kept up properly. It would be advisable to recommend that the exhibitor keep them up or have him paid for renewal.

T. M. MULLIGAN: Should there not be a representative of the different districts who would be responsible for the different exhibitors from that district?

THE CHAIRMAN: You cannot do that according to the Act incorporating the Exhibition Association. There is only one representative of the Vegetable Growers' Association, and the executive is responsible for the appointment of that member. That is all they can do under the law.

My opinion of the whole thing is that the authorities of the Canadian National Exhibition are trying to crowd out our exhibit, perhaps not deliberately. The last day of the Exhibition the director in charge came along with a man and team and gave onions and everything else away. They have no right to do that. I have written them myself and I know others have written sending a bill for the stuff. They did not acknowledge having received that at all. We considered that we were entitled to compensation for the stuff they gave away. I don't think the authorities would care if the vegetable exhibit was crowded out.

J. LOCKIE WILSON: The point is that our Vegetable Growers' Association take great pride in their exhibit. Now if the prizes are so small that it will not pay them to replace those exhibits, I do not think the Vegetable Growers should exhibit at all, because it certainly is not a good advertisement to have the thousands who visit the exhibition view decaying vegetables. The Field Crop exhibit has always been replaced through the good offices of the President and Mr. Tizzard, and unless the Canadian National Exhibition directors with their large surplus every year, will engage some vegetable grower to replace that stuff from time to time, you would be justified in not exhibiting at all. It is no credit to have exhibition visitors come in and see vegetable exhibits in such bad shape. I took this matter up with the directors a couple of times. I asked them to take them away because it was really disgraceful the way they were left lying there from day to day until the exhibit became a laughing stock of everybody, and I think that with the large surplus of the Canadian National Exhibition, they should be prepared to look after this. Is it not to their interest to see that everything is kept there in right condition?

F. G. H. PATTERSON: As a newspaper man who writes for a number of papers I am employed every year in giving a report of the fruits and vegetables at the show. I considered it my duty last year to comment somewhat unfavorably on

the vegetable exhibit at the Canadian National Exhibition. I was there in the second week, and it certainly was very poor, and I could not, in justice to the people who employ me, do otherwise than say the truth. I fully agree with what the previous speakers have said. It is the greatest possible mistake to have your vegetables there unless they fully reflect credit on the vegetable growers of this country.

THE CHAIRMAN: Another item in the Secretary's address was the training of field crop judges. It was our intention to have them this year meet at the same time as the Field Crop Judges for agriculture met. The Department, however, stopped the finances as far as the Field Crop Judges were concerned and that put an end to this excellent educational work for this year.

J. J. DAVIS: At the present time it is rather a hard matter to get judges who will leave their business long enough to go and judge. Perhaps after the war and when the labor problem gets a little easier it will be feasible. In the meantime, if we could formulate some rules of judging it would be a good idea. Then every man would be looking from the same point of view. Perhaps that would work out to a certain extent, although it would not be as good as men going out and getting object lessons in a short course.

THE CHAIRMAN: The big problem is going to be the men who are going to tell us how to judge. We all have our own ideas. At present we cannot afford the time. Last year it was one of the biggest jobs to get enough judges to go around.

REPORT OF VEGETABLE SPECIALIST.

S. C. JOHNSTON, TORONTO.

Demonstration and educational work among vegetable growers has been carried on during the past year to give available information of value to all vegetable growers. At the outset it must be pointed out that the season has not been favorable for either experimental or demonstration work, for the early part of the season was extraordinarily wet and the latter part equally dry. I have also been handicapped with regard to labor. The young man who looked after the celery work last year enlisted last March. His services were not available, and as a consequence, the sum total of work carried on this year does not appear as large as last and yet, in spite of this, new lines have been started and considerable material is ready for further demonstration next year. The demonstration work on prevention of celery blight had to be curtailed somewhat this year, but several plots of celery were looked after and the results have been as good if not better than in other years. I am glad to state that the spraying of celery is rapidly becoming a common garden practice, and even this year when the price of bluestone ranged from 20c. to 32c. a lb., the celery growers did not hesitate to pay this price in order to protect their celery, and many new machines have been purchased for this purpose during the last year. A careful estimate shows that $50,000 worth of celery this year is saved in the Province of Ontario, due to some extent to the popularizing of the use of bluestone as a prevention of celery blight. I have nothing new to offer excepting that the celery grower must not relax his weekly habit of spraying. Some growers experimenting for themselves advise me that on small gardens two rows can be more easily handled with a horse and cart than four as recommended here two years ago. The two-row sprayer is said to be handier in turning on the narrow headlands.

At last year's convention mention was made of work commenced in the Kingston district to overcome onion blight. Very careful experimental work was carried on with Bordeaux mixture again this year with negative results. The onions were grown in patches 15ft. wide, and a boom carrier was made which supported the nozzles (one for each of eight rows) so that the spray mixture was applied directly over the onion. This work was commenced before any trace of blight could be seen and carried on faithfully once and sometimes twice a week and yet in the blighting season in the Kingston district the treated patch was practically no better than any other. This is the second season that our results have not been of value and it is hoped that next season some more definite information may be secured.

Cabbage Root Maggot Control.—Between 10,000 and 12,000 cabbage and cauliflower plants were treated with Corrosive Sublimate as referred to in my report of last year. Check rows were left usually in the centre of the plot. From observations made, the eggs of the cabbage root maggot fly were laid in as large quantities as last year. However, no cabbage or cauliflower in our plots were attacked with the maggot either on the treated or untreated rows. The only reason for this that I can give is that the season was too cold for the hatching of the eggs, and nature herself accomplished her own work much cheaper than man could have done it. This does not in any way reflect on our 1914 results, and it is hoped that in the coming season considerably more work may be carried on with more complete results.

Vegetable growers' Conferences were held in Toronto, Hamilton, London, Brantford, Stratford, Kingston, Sarnia, Tecumseh and Burlington, a total of nine for the Province, five more than in 1915. Practical growers gave excellent addresses on phases of vegetable growing in which they were expert and by discussions much information was given which apparently was of value to all present. An illustrated lecture on "Fungus Diseases and Insects Troublesome to the Vegetable Grower," was given at each conference.

Dust Mixtures.—A new line of work has been taken up during the past year with the hope of determining the value of dust mixtures in the prevention of fungus diseases and insect pests on vegetable crops. Two machines were purchased and dust mixtures composed of lime and sulphur were applied to the following crops to prevent or control their respective pests: Onions, potatoes and celery. These dust mixtures are ground very fine, as fine or finer than high grade flour, and as a result, the particles adhere to the surfaces of the leaves and act as a fungicide or insecticide when a poison is added. This work has been fairly satisfactory for this season, but I would prefer waiting for another season's work before giving results.

Sterilizing Greenhouse Soil.—The soil in a greenhouse 30 ft. wide and 150 ft. long was sterilized this fall to secure information regarding this important phase of commercial greenhouse work. Live steam was used and introduced into the soil by various means including land tile, inverted pans, pipes with holes drilled every six inches, pipes with Skinner nozzles set every six inches and by the Spike Harrow System. A careful record is being compiled of the quantities of lettuce, tomatoes, etc., from this house as well as from an adjoining house which was not sterilized, to determine the value of sterilization for greenhouse soils.

J. Moulton: Mr. Johnston does not say whether he has secured any results from this dusting spray. Are you encouraged to go on with it any further?

S. C. JOHNSTON: Yes. I am going on. I could not give you any information to-day. The conclusion I have come to is that different mixtures have to be found for the different vegetables, and I would not like to give you any information, because what I have is entirely different from anyone else's, and next year, I believe, we will be able to dust our vegetables and control insects and disease cheaper and more efficiently than we have been doing with the liquid sprays.

C. MCNICHOL: I would like to ask Mr. Johnston what he paid for the corrosive sublimate this year. I tried to get it in our district and they wanted 75 cents an ounce. The maggot was stronger in our district this season than ever before. They almost cleaned us out of cabbage and cauliflower.

S. C. JOHNSTON: The corrosive sublimate that I used this year was bought at a comparatively low price, because it was purchased before the advance. I

Musk melons.

have not figured out whether it would pay you to-day to use at present prices. There is another material that we have figured on using which would be even cheaper than corrosive sublimate under normal conditions.

CHAIRMAN: How would the cost of spraying with the dust spray compare with the labor and expense of spraying with Bordeaux?

S. C. JOHNSTON: From what I have done, you will be able to cut down your labor bill, and carry on continuous spraying until your patch is finished, that is you can carry enough dust with you on your cart to spray practically all you have got. The amount is so small, and yet it will cost you more than the materials for your liquid spraying. Figuring the whole you will be able to dust cheaper than you can apply your liquid sprays. It is a much nicer material to handle. There is no dabbling in water, no nozzles to clog up.

J. J. DAVIS: Would you recommend it to be done in the morning while the dew is on?

S. C. JOHNSTON: The fruit men who have been using these dust sprays—and most of the work with dust mixtures has been done by them—say it can be done at any time, and the reason for that is that the hairs on the surface of the leaf catch the particles of dust and hold them there; and the same would apply to the vegetables. It does not matter whether it is damp or dry.

F. G. H. PATTERSON: I may just mention in connection with this that Prof. Caesar's experiments were very successful in the case of scale and complete with the case of the codling moth, 90 per cent. of the scale was killed and the codling moth was completely killed.

J. J. DAVIS: In connection with the cost of such a mixture, if a man had the cabbage maggot as badly as Mr. Parks of Ottawa had it, it would almost pay to operate with gold dust. Whatever the cost of the material might have been, there would have been big money in it for him if he had been able to secure it and prevented the maggot. There is an enormous advance in the price of all insecticides and fungicides.

THE CHAIRMAN: I don't think there is any question but that the price you pay will more than compensate for the results you get. This year, of course, as Mr. Johnston said, the fly was not so bad in some places; it was very bad in others—in Stratford and Ottawa for instance. I think it would pay them at any time to use it.

T. M. MULLIGAN: What about tar disks? Have you done any experimenting with them.

S. C. JOHNSTON: I gave a comparison with the tar disk and corrosive sublimate last year—I will read you part of it.

The corrosive sublimate, loss less than 1 per cent.

Tar-paper disks, loss 5 per cent.

Check rows, loss with water, 60 per cent.

Check rows, loss without water, 100 per cent.

Four ounces of corrosive sublimate were dissolved in forty gallons of water. The solution was applied with a water can once a week for five weeks. Cost of materials for 1,000 plants treated with corrosive sublimate:

Seven 4-ounce packages of corrosive sublimate at 12½c. per oz...	$3 50
Five hours' time (one hour per week) for man at 20c.	1 00
Total for materials and time	$4 50

TAR-PAPER DISKS.—Commercial tar-paper disks were secured from Rochester, N.Y., and were placed around the plants at the first sign of eggs. These had to be taken off and replaced after each hoeing or scuffling, as the earth was thrown on top of them, destroying the influence of tar-paper. The cost of treating 1,000 plants with tar-paper disks is determined as follows:

One thousand disks at $2.00 per M., plus duty and express.....	$3 75
Time of adjusting, replacing and cleaning 1,000 disks for 5 weeks at rate of 2 hours to place 250 disks—40 hours at 20c. per hour	8 00
Total cost materials and time for 1,000	$11 75

This gives a difference in cost of $7.25 for the treatment of the same number of cabbage for the whole season.

The quality of the cabbage treated with either corrosive sublimate or tar-paper disks was 50 per cent. better than those plants which survived in the check rows.

The tar-paper disk is not a failure, but it is too slow. I don't think any vegetable grower can afford to use it after we have demonstrated the usefulness of corrosive sublimate.

SCORE CARDS IN GARDEN CONTEST.

J. J. Davis, London: I was unwise enough to offer a little criticism on the score card in the Garden Competition at the meeting of the Executive, and I was told that it was up to me to provide something better in its place. I find that it is easier to criticize another man's work than it is to put up something better yourself. However, I have tried, and whether I have succeeded or not I shall leave it to you. If I have not succeeded in making a better score card, we can all get together to-day and accomplish the task.

Mr. Davis' revised score card is as follows:

(*a*) Straightness of rows and proper spacing of plants .... 10 points
(*b*) Arrangement of space in garden ..... 10 points

(*c*) Instead of layout and general arrangement of necessary stables, greenhouses, etc., as the old card read, Mr. Davis suggested as so many have no control over their buildings, living on rented premises, that this read:

Neatness and cleanliness around yards and buildings ..... 10 points
Neatness, care and cultivation ..... 40 points

The reason for changing from 20 on the old card to 40 on the suggested new one, is the importance of care and cultivation in getting rid of weeds.

"Condition of implements and other necessary appliances," which appeared on the old card, Mr. Davis suggested be struck out entirely, as it did not matter what tools a man worked with so long as he accomplished the result. It was easy for the wealthy man to have the best kind of tools, if the poorer man accomplished like results with inferior tools, all credit should be given him.

Mr. Davis suggested further that the next item, "Variety of crops grown (crops of less than one-tenth acre not to be considered)" be cut out as it did not matter much what kind of crops a man grows—this was rather a matter of temperament. In its place he suggested putting

Cleanliness of fence corners, head lands, pasture plots .... 10 points

as he had remarked last year in his judging trip, how well kept gardens were often ruined by the fences.

Mr. Davis suggested that the old item of "Marketable value of crops" with 30 points, be cut out entirely; as it would mean in every case that the big man would get the prize. You would not be giving the prize to the cleanest and best kept garden, but to the one that had the enormous market value. At the same time, Mr. Davis suggested in place of this item to put in,

Closeness of planting ..... 20 points

as this would give the man who had to do a lot of handwork in growing the smaller stuff, a little advantage over the man growing the larger stuff.

A general discussion then followed, in which Mr. Tizzard suggested that something be given the man who keeps his place nicely along the road, Mr. Reeves, the Chairman, contending if Mr. Tizzard's place was surrounded by real estate men with their vacant lots ill-kept, he would understand the difficulty of such a proposition. Mr. Tizzard asserted every man had a frontage of his own.

J. J. Davis: It seems to me a man is not responsible for the view. It is a very nice thing for a man to have a nice front to his place, but it seems to me that it should be taken into consideration in this instance that the emphasis should be put on the man's efforts, for a man to do all that he possibly can. Of course some men are better situated, naturally. You will notice at the bottom of the score card that in cases where there are natural obstacles that a man cannot overcome, the judge should allow a maximum of five points. I would suggest that that be left standing.

J. Lockie Wilson: I would suggest the better way to deal with the very excellent suggestions given by Mr. Davis would be to start from the first and finish as we go along, and settle the matter. It is a very important thing for you to have the score card as perfect as possible.

The Chairman: I am very sorry that Mr. Delworth is not here to help me out on this. We arranged the card, in our opinion at that time, the best way we could, and as these points are taken up I will try to explain why we did it.

After considerable discussion over each item, a new score card was determined upon as follows: .

Layout and general arrangement, considering:

	Points
(*a*) Straightness of rows and proper spacing of plants	10
(*b*) Arrangement of space in garden	10
(*c*) Neatness and cleanliness round buildings and yards	10
(*d*) Neatness, care and cultivation	40
(*e*) Clean fence corners, headlands, pasture plots	10
(*f*) Closeness of planting, and marketable value of crop per acre considered	20
	100

If points are lost owing to natural difficulties impossible to overcome, the judge may allow a maximum of 5 points.

Moved by Jno. Tizzard, seconded by T. M. Mulligan, "that the amended score card be adopted." Carried.

The Field Crop Competition score card was only slightly changed and stands as below:

	Points
1. General appearance of crop, considering:	
(*a*) Method of planting, stand of crop	15
(*b*) Vigor of growth	5
2. Freedom from blight and insects	10
3. Thoroughness of cultivation	15
4. Uniformity of type and purity of variety used	10
5. Market value	45
Total	100

HOME GROWN VEGETABLE SEED.

A. McMeans, Brantford.

It has been aptly said that "Vegetable seed can and should be grown in a soil and climate suitable for the production of the vegetable." Such being the case would it not be wise for the vegetable growers of this Province to give more thought and study to the seed production end of the vegetable business. In the past too little attention has been paid to the seed end. It has been very easy to either go or send to the seedsman for your requirements, no thought or attention given to the source of supply, nothing but a trust in the dealer and a hope that they would turn out good. The slogan of the vegetable grower when purchasing seeds should be "not how cheap but how good," not price but quality. An instance that came under my observation the past summer will serve to show the difference in seed. This grower had two blocks of Early Jersey Wakefield Cabbage, about five thousand in each block. Seed was purchased from two reliable seed houses, A and B. On looking these blocks over rather carefully, a big difference was noted. I put the question to the grower, "How much more is the B plot worth than the A?" His reply was, "It will make a difference of over $10 to me." Sometime in the past we have all gone through a similar experience, or perhaps a total crop failure, and yet we smile and go on buying our seeds from a middleman.

Why do we sometimes find such a difference in seeds of the same variety? Briefly, we may say, climatic influence where seed was grown, careless rogueing and selecting and the difference in opinion of the contract grower's idea of what constitutes the exact ideal type of the variety. Take the case of Copenhagen Market Cabbage. This valuable variety was introduced to the garden trade by a well-known American seed house in the year 1911. The following is the introducer's description: "The heads average about ten pounds each in weight, are very solid, with small core and of fine quality. It matures as early as Charleston Wakefield, and will give a much heavier yield per acre than that popular variety, the heads being produced almost on the ground level. The leaves are light green, rather small, saucer shaped and always tightly folded." What happens? It goes out to the market grower, either under its correct name or under any other name the particular seedsman distributing it may choose. Here arises the first point of confusion to the vegetable grower. The type takes with the market, consequently demand must be met, and the seedsmen send out their stock seed to the contract growers, who grow them their seed supply for another season. For the sake of making sure of a stock of seed, necessary to supply the demand, the stock seed may be issued to as many contract growers as the seedsman deems necessary. These contract growers may be situated in different countries or different parts of the same country. What is the result? Each of these contract growers proceeds to grow a stock of seed true to type. It must be admitted by anyone conversant with seed trade conditions, that the majority of contract growers are men, well up to their work and with a reputation to sustain. But it is human nature to err or be variable, because these contract growers have nothing to guide them, but the introducer's brief description, or perhaps they saw the variety growing in the introducer's trial grounds. So we have each of these contract growers with his own fixed idea of what constitutes a perfect Copenhagen Market Cabbage and he selects for that type accordingly. Add to the above climatic and other influences and we have still more confusion.

If we pause to consider the comparative cost of the seed to the value of the resulting crop, we find that in most cases it is so low as to be almost lost sight of. It is well known that the vegetable grower is a very busy person during the growing season and does not wish to be burdened with the added duty of growing his own seed requirements, also the average grower thinks that there is a wizardry beyond the knowledge of the ordinary man in seed growing or seed breeding. Thus we have about three reasons why the vegetable grower does not grow seed. Forgetful of the fact, that unless he has full knowledge or control of the source of the seed used by him, he does not control his business, for the seed is the foundation of the vegetable business.

Under the best cultural conditions of the present day the environment of the different plants of any one variety, in a field, is practically the same, but there is usually a variation, either in the quantity or quality of the product; much of this variation is due to a difference in the individual seed. So that in our selection of stock seed we should make sure that each and all of its ancestors, back for an indefinite number of generations, are of the exact and desired type. One of the chief steps in seed growing or breeding is a rigid adherence from year to year to precisely the same variety type. Such adherence can only be accomplished when such variety types have been closely, clearly and accurately defined and described, and, if possible, supplemented by photographs. By frequent reference to these type books we can keep our exact type more closely in mind and note differences.

As before remarked, " Vegetable seed should be grown in a climate suitable for the production of the vegetable." A climate suitable for vegetables where the portion eaten is the seed, such as peas and beans, would be one that induced rapid growth, for we well know that the product is wanted as soon as possible after sowing, and it is a difficult matter to get varieties early, where the vegetable naturally grows slowly.

For the class of vegetable where the substance is the part consumed, such as lettuce, a climate or soil condition should be selected where growth is rather slow, for the longer the period of growth before running to seed, the more profit will it bring to the vegetable grower; if the seed stalk in lettuce makes its appearance early, the result is unsatisfactory and the quality very poor.

It is needless to state that nearly all seeds will reproduce themselves more freely if sown as quickly as possible after maturity. This is quite plainly shown by the way weeds reproduce themselves, the seeds of which are sown as soon as ripened. But in vegetable seed selection where the seeds are only used to produce the plant, the opposite course should be pursued and forms selected that produce as little seed as possible. As an instance, I may say that all vine seeds do well in a warm climate and on rather dry soils. The farther they are removed from this condition the less seed they will produce, also the vitality of the seed will be lower; but it will also be noted that the less seed produced the greater will be the fleshy covering, and as it is this fleshy covering which is the thing desired, it therefore follows that the less seed there is produced the greater is the value for the production of a vegetable crop. Vegetable growers have noticed the fact, that the older vine seeds are, the better, so long as they have germinating power left, the resulting crop showing the vines to be more productive of fruit, less inclined to throw out runners and the fruits more fleshy. The same can be said of the egg plant which is a native of the East Indies.

Nature does not work in the interest of either the market grower or seedsman.

Her object is to perpetuate and preserve the species, and when the plant has furnished the required amount of seed nothing further is demanded of it. If a plant grown in a temperate climate produces in a single fruit only one-third the amount of seeds which it usually yields in a warm climate, it naturally follows that three times the number of fruits must be produced to secure the same amount of seed.

In the development of the cabbage, we have probably seen more changes of form through selection and climatic influence than in any other vegetable. The cabbage in its wild state is entirely destitute of a head, but has a rather succulent stem and leaves. Botanists tell us that from this wild plant originated not only all our forms of cultivated cabbage, but also all the forms of kale, kohl-rabi, Brussels sprouts, broccoli and cauliflower. From Long Island we have seen several new varieties of cabbage introduced to the trade. Certain growers who have made a specialty of growing this vegetable and who as growers were close observers noticed

Growing onion seed.

differences in their crops, not only as regards earliness or lateness, but differences in type as well, also the differences in soils in close proximity to each other. Starting with the same stock seed and growing it for years on a heavy soil, with a liberal supply of plant food and constant and careful cultivation, a type will develop remarkable for its size, vigor and keeping qualities. On the other hand, starting with the same stock seed under the same climatic influence and careful cultivation but on a light sandy soil and selecting with a view to earliness, the result will be a variety of the same general form, but of smaller size and very much earlier. These specialists have also practised helps of an artificial character, such as when harvesting their stock seed, they examine each plant carefully, and if the seed is of large size it is rejected, as they hold that such seed will have a tendency to run to leaves instead of heads. They will not use seed until it is three years old, for the same reason that they will not use large seed.

In seed selection the entire plant should be taken into consideration, rather than the individual part or fruit thereof. So many people in saving tomato seed, select out a basket full of nice extra choice fruits, picked indiscriminately, and to be saved over for seed. The following year they wonder why the tomatoes do not turn out as nice as the fruits selected. It is said that the late A. W. Livingstone spent the first twelve years of his work in the development of the tomato, by selecting the choicest specimens of individual fruits, without taking the plants that had produced these fruits into consideration. It was not until he selected fruits from the plants most nearly approaching his ideal, that he began to make real gains.

In seed selection of biennial plants, such as beets, carrots or onions, the seed grower usually selects one hundred or more choice specimens; these are usually gone over again before planting and re-selected down to ten. These ten are then planted in an isolated spot, and seed saved separately from each individual plant. A small sample of each of the ten is sown the following year, and the sample showing up the best is selected as a breeder. The balance of the seed selected as the breeder is sown the following year, and selection is again made and carried on as before described. This is to breed up a pure stock.

Nearly every market grower has a specialty, that is, a variety in which he takes a little more pride than he does with the other varieties grown by him. My advice would be (and in saying this I am keeping in mind, how busy you are) to grow some seed of your specialty and by so doing you will not only be more interested in your crop, but will learn to distinguish differences, and the chances are that from noting these you will become a better grower.

J. J. Davis: That paper was so good and covered the ground so thoroughly there is little comment to make.

J. Tizzard: The Association or the Government should take up the question of seed potatoes. In Ontario it is almost impossible to get good ones. What we do get are generally sent up from Quebec or Montreal, and very often they are bad or not very good for seed. Just as good potatoes for seed can be grown in Ontario as in any place in this continent if the right course is pursued. It would not pay a man to go in largely for seed potatoes, but either the Association or the Government should take up the question. The only way that seed can be grown is to have someone who understands growing seed have it properly selected and sprayed and well looked after. I had some experience a few years ago with growing seed potatoes, three lots at three different times. I grew some from sprouting potatoes, from which I took one bushel for seed; then ordinary potatoes in the ordinary way from which I saved a bushel. I had a second crop of potatoes put in after July 1st. I saved a bushel of those for seed. The ones that were saved from the sprouting potatoes were very poor. The next was not very much better. But the ones grown from the last crop could not have been better. My own seed gave me as good results as from Wisconsin grown seed the same year.

Prof. Crow: How many here make any attempt to grow any seed at all of their own? I expect you do in tomatoes and the like of that, but I mean outside of that. How many men make any effort to grow seed, beet, carrot, celery or onions, the kind you usually purchase from the seed man? I have had a little experience in the matter, and I think I have the material which will convince any of you that there is something in this matter of seed growing. The Seed Commissioner at Ottawa, Mr. G. H. Clark, suggested to me last spring that it would be an excellent

idea to have accurate tests made of Canadian grown seeds. You are aware, of course, that for the last two years since the war started the Seed Division at Ottawa has been encouraging the growth of various seeds in Canada. This is now Mr. McMeans' work in Western Ontario. I followed out Mr. Clark's suggestion. I have here a series of photographs taken at the College this fall, showing the tests of Canadian grown celery seed. Mr. Clark furnished me a list of the Canadian seed growers. I wrote them all for samples and those were grown side by side under uniform conditions, and I have here photographs of the result. These photographs show that there is a good deal of difference in the origin of the seed. The best results from Canadian grown seed come from the Hospital for the Insane at Hamilton and from the Hospital for the Insane at Whitby, and at those institutions there have been men who for some years have been growing their own seed. Their seed turns out better than any other I have been able to get, and it goes to show that there is something in keeping this work up continuously.

Here is a series of photographs, five pictures showing five different types of plants found in the progeny of one parent seed plant. Then there is another series showing six different strains of the Winter King variety. We have grown seed of this variety from six different plants and we tested out each of the six different plants separately.

Then there is a series of Paris Golden, self blanching. We have grown seed which compares favorably with what we have secured elsewhere.

I have noticed all the plants develop a tendency to grow suckers. The only strain we have which shows plants without suckers is the commercial strain.

As to the future development of this line of work it seems to me that the interests of this Association are of such a nature as to make this work of great importance. It seems to me this Association will recognize at once the importance of seed growing work. I may say that the plan under which we are operating is in connection with Mr. McMeans. Mr. McMeans calls on us quite frequently, and has, in fact, this fall looked over our stocks of onions, celery and beets. We are doing some breeding work on Golden Bantam corn. We are growing beets, carrots, corn, cabbage, celery, also a little spinach this year, lettuce—Grand Rapids and two head varieties—Golden Bantam sweet corn and potatoes.

Our plan is to grow the best seed of these varieties that we can possibly produce by careful selection. Then the project is to have that stock seed placed in the hands of men who plan to grow commercial stocks of seed. Mr. McMeans, of course, is in touch with those who are going into and developing the seed business, and our stock seed will go into their hands. The seedsman, of course, if we happen to turn out anything specially good will eventually get it, but we aim to put it in the hands of Ontario growers who are anxious to go into the seed business. We ripened this year our second generation of Canadian grown celery seed. If any of you would like to test it out we can supply it.

J. J. Davis: In my judging trip last summer I came across a very fine patch of corn, and the grower informed me that he had been selecting his own seed for about twenty years, until he had got a selection of Cory corn such as I had never seen before. The type was fine, but it was much larger than Cory.

Prof. Crow: Later in the season?

J. J. Davis: I could not tell much about that, but it certainly was an eye opener as to what could be done by persistent selection of seed.

A McMeans: Can I get the man's name? If you are going to grow a vegetable you have got to define your type hard and fast, and stick to it. Unless we

have our variety described hard and fast and stick to that type we are going to get away from it, as this man did with his corn. If you are going to grow a type of corn larger the chances are that it will mature a few days later. There are many people growing Golden Bantam corn who are getting away from the type. In 1865 there was a book written on "Vegetable Growing in America," in which the author described a variety of corn known as Golden Corn. It did not take very well on the market at the time, but in Massachusetts, E. L. Cory, a well known vegetable specialist, happened to run across it, told Mr. Earl about this yellow sweet corn in Greenfield, Mass., and the seed firm sent and bought a peck of it. It made a big hit and you can to-day go into a restaurant and find it served as Golden Bantam Corn.

C. E. DURST: It is pretty difficult to add anything to this valuable discussion, but I am going to attempt to explain some of the principles underlying the improvement of plants. We are led to believe by some persons that the matter of improving a plant or creating a new variety is an extremely difficult matter, and that there is more or less mystery connected with it. The fact of the matter is that plant improvement is not a difficult or mysterious proposition when one understands a few underlying fundamental principles.

There are three ways by which results can be accomplished in improving vegetables. The first of these I shall describe is by selection. Suppose, for instance, that we wish to increase the length of ears in sweet corn. We would look over the plants while growing in the field and select seed from stalks bearing the longest ears. The following year we would get not all long ears like the ones we chose for seed, but a number of ears varying from large to small. Some of the largest should be a little larger than the ears we selected the previous year. By selecting seed again from stalks bearing the longest ears, and by repeating this process from year to year, we gradually increase the average length of the ears.

One should not expect pronounced results at once from selection, for improvement by this method is a slow process. Furthermore, if any improvement that is secured is to be maintained, rigid selection must be kept up, for the moment selection is discontinued and seed is selected from the general crop there is a tendency for the stock to return quickly to its original condition.

In making the selection the plant as a whole should be taken as the unit rather than the individual fruit or specimen. For instance, if I desired to increase the size of fruit of a certain variety of tomatoes, I would begin by selecting seed from plants bearing large fruit as a whole rather than by saving the seed from the largest tomatoes, irrespective of the plants from which they came.

The possibility of improvement by selection depends to a certain extent upon the method of pollination of the variety or species in hand. Many of our vegetables, among which are lettuce, peas, and beans, maintain their existence by self-pollination; that is, the ovaries are continually fertilized in nature by pollen from the same plant. A species which is continually self-fertilized tends to become purer and purer, in fact it can be proved mathematically that a self-fertilized species will become about 99 per cent. pure in only six generations. In view of these circumstances, it is not an easy matter to improve a self-fertilized species by selection.

There are other vegetables which propagate themselves by cross-pollination; that is the ovaries are fertilized by pollen from other plants. Cross-fertilization always causes more or less variation, and the more variation there is the greater possibilities there are for improvement by selection. Examples of cross-fertilized

vegetables are corn, cucumbers, muskmelons, watermelons, and egg-plants. It is, therefore, in the cross-fertilized species that the greatest opportunity exists for improvement by selection.

The second method by which we may improve vegetables is by taking advantage of mutations or "sports," as some people call them. A mutation is a plant that suddenly, without apparent cause, sets up a new standard for itself, and thereafter breeds true to that standard. In other words a mutation is at once permanent and does not need to be maintained by selection—there is no danger of its returning to the previous condition.

Some persons, among whom are some seedsmen, would have us believe that mutations or "sports" are very frequent, and that this factor is a great obstacle to bringing about a systematized nomenclature; however, the fact of the matter is that true mutations are a comparatively rare thing. We often find plants, coming from a lot of seed purchased in the open market, which are quite different from the rest of the lot. No doubt many persons look upon these as being mutations, but the fact of the matter is that these "off" plants are very frequently the result of cross-pollination rather than mutation. One can easily test the matter by pinning a bag over the floral parts of these plants so as to insure self-fertilization, and allow the same to go to seed. If the plants of the next generation show considerable variation, the plant was, in all probability, not a mutation, but the result of a chance cross with another variety in the seed field. There is a tendency also to mistake for mutations, plants resulting from seed of a foreign variety, which may have become mixed with that of the variety purchased. Of course, such plants will breed pure, and the only way for one to know whether or not he has something new and valuable is for him to be well acquainted with varieties.

The third method of improving is by crossing. By this method we provoke variations, no matter whether the species is naturally self or cross-fertilized, and it is by selecting and fixing the variations which occur that improvement is brought about. Some persons believe that the technique of transferring the pollen from one plant to another is the all-important matter, but the fact of the matter is that this is only an incidental feature of the whole proposition. Genitisists usually make careful measurements and studies, and often apply to them extremely complicated mathematics in order to determine the manner in which heredity occurs. The practical gardener, however, is more concerned with results than with explanations, and the procedure I shall advise is, I believe, a practicable one.

Suppose, for instance, that we had two varieties, each of which possessed characteristics which we wished to combine in one variety. The thing for the practical grower to do would be to plant these two varieties side by side and allow them to cross-pollenate. If he has a greenhouse better results in securing the crosses can usually be secured inside than outside. Even with self-fertilized species there is occasional cross-pollination, but if he has any reason to fear that this will not occur he may easily effect crossing by transferring pollen from one plant to another. He should save the seeds from the two varieties separately and plant them carefully.

Some of the resulting plants will be crosses, while some will probably not be. The crosses can usually be distinguished from the parent varieties by their different appearance. Usually they are intermediate between the two parent varieties in one or more important respects. The plants which are crosses should be bagged just before they come into flower to insure self-fertilization. No permanent results should be expected from this first generation, and one should not be disappointed

if the plants are apparently worthless. The plants of this generation are usually very uniform in character, and it is natural that they should be, since they are simply the expression of the combined characters of the two parent varieties.

The seeds of the first generation are saved carefully and planted. It is in the second generation after crossing that re-combination takes place, and it is by selecting out the plants showing the desirable characteristics and selfing than as before and saving the seed that we accomplish results. Sometimes a new type is permanently fixed the second generation after crossing. More often it requires five or six generations to get the type fixed. I believe that the method described is adapted for use by any intelligent practical grower. Vegetables as a whole are rather flexible in nature, and offer great possibilities for improvement. Without a doubt many valuable improvements can be made by intelligent commercial growers who will give some attention to this matter.

Before the year 1900 no one understood very much just how progress could be accomplished in this way. In 1900 the law of Mendel was re-discovered and the re-discovery of that law made it possible for us to understand how results can be

Machine digging of potatoes.

accomplished. We learn in the first generation we bring together all the characters, in the second generation we begin to get pure alliance. In the second generation what we want to do is to take advantage of any good types we see. Of course they don't come immediately true to type, but by continuing for two or three generations it is possible to get them so that they breed pure.

Under the item on the programme of "Address by Fraternal Delegates from Ontario Horticultural and American Vegetable Growers' Associations," the chairman again called on Mr. Durst on behalf of the American Vegetable Growers.

Mr. Durst: I desire to say a word of appreciation of your organization. My understanding is that the Ontario Association is the oldest state or provincial vegetable organization in North America. This is certainly a matter to be proud of. It seems to me, furthermore, that you are having a fine convention. The death of your Minister of Agriculture caused the postponement of your meeting. Such matters always work greatly to the detriment of a convention, but in spite of this, it seems to me you have a very good attendance. In the State of Illinois, where I believe we have some of the finest land in the world, and where a great many very fine vegetables are produced, we do not have as yet a state vegetable organization. My hope is that the growers will see fit to organize some time in the

near future, and I would feel satisfied if they had as worthy an organization as yours.

PROF. CROW: I thank you for connecting my name with the Horticultural Association. It was my privilege to attend their convention yesterday and in contrasting that gathering with the present one I am reminded of a little story—you know the Horticultural Association is composed of the town organizations of amateur horticulturists, flower lovers, and needless to say the ladies composed quite a percentage of the audience—the story goes like this, perhaps it applies to vegetable growers, but it is related that when Adam and Eve were on their way from the Garden, having been forcibly expelled therefrom, Eve with her mind ever active and looking for something of interest asked Adam whether they should study politics, and he replied, "Anything at all to keep their minds off horticulture would be all right." It looks almost as if vegetable growers were permitting their ladies to keep their minds off vegetable growing. Of course I know that in vegetable growing the ladies have a very important part, and the woman's share is not altogether devoted to the interest represented by the Horticultural Societies.

As a representative from the Horticultural Societies our convention was better attended than usual, and was decidedly and highly satisfactory, as I am sure this Convention will be. It strikes me that conventions such as this are of the utmost importance in broadening and spreading our ideas. You leave some of your good ideas and take others away with you. For my own part the vegetable industry interests me very much, and as most of you know, I was for many years a fruit man and nothing else; but I have come to the point where the vegetable work interests me more than fruit work. There is a very large future in this Province for vegetable growing. I am not sure but that the vegetable interests for the Province of Ontario are at the present time worth more annually than the fruit interests. We have not the figures to show that, but taking the census returns for 1900 and again for 1910, and taking what we know has taken place since then, I believe that is the case.

Now the fruit men perhaps would not like that, but at the same time I believe it is right. Furthermore, I believe that the vegetable interests of the Province are liable eventually to overbalance the fruit interests of this Province ten times, and it will not be a great many years. Vegetable crops are necessaries of life and it is my impression of the fruit business, after a good many years of observation in it, that fruit is largely a luxury. This organization has in it, as the Scotchman would say, "the root of the matter."

FIELD CULTIVATION OF EARLY POTATOES.

HENRY BROUGHTON, SARNIA.

I have just a few notes I jotted down on the train and it is more for the average farmer than for the vegetable grower or the gardener, because the average gardener does not do field cultivation, he goes into intensive work and has perhaps half an acre or an acre.

There are large amounts of early potatoes shipped in here from our friends on the other side. You will notice about the beginning of May they begin to come in from the other side, and some of them probably until the end of September. Now while we wish our friends over there well we wish ourselves a little better,

and I think that it is just possible that we are spending a great deal of money that we might keep at home. We ought to be able to ship carloads of potatoes, which we do from the Sarnia district, not later than the third week of July. We probably at that time every year for the last ten years ship carloads, possibly every day, from that district, or every other day. Last year our Association at Sarnia sent out before September 2,880 bags. That is one association only. We have two associations there; the others possibly did the same besides supplying our city with their requirements. The value of potatoes shipped out during 1916 from Sarnia district reaches up to about $12,000. Now those potatoes, with very few exceptions, were dug in the green state, they were just as green as ever, except perhaps at the end of the season.

F. F. Reeves: What is your average yield per acre from the Sarnia district?

Hy. Broughton: About 150 bags, taking one year with another, and the average price the members of our Association have received for the last five years is $1.37 per bag. I have no particulars about the other association.

With regard to soil. We all know what soil is required for the early potatoes, but for those who are just growing a few potatoes for themselves it may be of interest to say that the average soil of Ontario, especially in the southern counties, all the way down to Essex and Welland, can grow all the potatoes that Ontario requires. While touching on early potatoes Irish Cobblers are just as profitable to grow as the later ones.

Preparing the Soil.—Potatoes from a farmer's point of view are one of the best rotation crops we can grow. Take a rotation of three years, potatoes following wheat, then clover, then potatoes again, or take a four year rotation—potatoes, wheat, oats or barley, followed by clover. By so doing you get the very best results from your manure or from your fertilizer for your potatoes. You follow with wheat, without scarcely any cultivation at all, the ground being left in the very best condition for growing wheat. During the season of 1915 a brother of mine at Whitby from 30 acres grew 64 bushels per acre of fall wheat sown on potato ground. We use 12 tons of barnyard manure per acre, supplementing that with 500 lbs. of fertilizer.

Mr. Tizzard: What fertilizer do you use?

Hy. Broughton: Last year I used a blend of 7½ per cent. ammonia, 15 per cent. phosphoric acid, at a cost of $36 a ton, 500 lbs. to the acre.

After the manure is put on with spreader we plow not more than 5 or 6 inches, giving it only one stroke of the harrow, some people disk and harrow it more than once and even roll it. All I want is one stroke of the harrow on my land, because I want the soil for early potatoes just as light as it can be had.

I treated seed for scab once and it was very successful. We get our seed usually from Wisconsin through a Chicago house, ordering about two carloads every year from there for our Association. The other Association does possibly the same thing, although they get some from New Brunswick. And we have had such good results from northern grown seed that we do not want anything else if we can get it.

J. J. Davis: Suppose we inaugurated a method of growing seed potatoes. Are you so well satisfied with those that you are getting from Wisconsin that you would not want to change and buy yours from us?

Hy. Broughton: I am more than satisfied to remain where I am for the simple reason that I know I am right where I am; I might not be otherwise.

Prof. Crow: Would it pay the rest of the growers here to buy through you?

HY. BROUGHTON: That is another proposition altogether. In regard to immature potatoes. I have been growing potatoes the way I mentioned for possibly fifteen or twenty years. Up to about five years ago if we dug our early potatoes quite green we used to draw the small ones away, using them for pig feed. At some of our meetings a speaker said that immature potatoes would grow the very best of crops next year. I said, "If that is the case we have been losing a lot of valuable seed in the past," so I selected a few bushels and let them stay on the ground in the summer time until they got quite green. I put them in the cellar and kept them there until early next spring. They were the first ones to sprout alongside the others that had been harvested and taken care of for seed purposes. I planted them alongside the others and the result was that they came first through the ground and produced, if anything, a better crop.

A MEMBER: Was that your own grown seed?

HY. BROUGHTON: Yes.

J. LOCKIE WILSON: Can you use those small potatoes from year to year?

HY. BROUGHTON: We always did. We take the very best potatoes we can get by buying from Wisconsin. We may keep those small potatoes next year and try them. We get such good results from northern grown seed that it more than pays for the seed.

I had an illustration of this last year when I met a seed man on the road to whom I had sold some seed in 1914. He asked me if I could get him some more of that seed, that the man whom he had sold it to had asked for it, and told him that the seed had been planted alongside his own growing and he would have done well to pitch his own growing in the ditch.

We plant our seed with two eyes. I was born and raised in Lincolnshire and used to plant potatoes out of the pail in the furrows. My father at that time would have me go through the field of potatoes after they were up 6 inches, and if there were more than two stems in the potatoes growing he would have me pick all the small weak ones out. He had found out that the fewer stems you have the larger the potatoes get.

J. LOCKIE WILSON: How long do you cut them before planting?

HY. BROUGHTON: The same day if possible.

A. MCMEANS: Don't you find white potatoes increasing in favor with the people?

HY. BROUGHTON: We do in Toronto, but in the northern country they don't care what they are as long as they are a good potato.

F. F. REEVES: What varieties do you use?

HY. BROUGHTON: The Ohio Junior. Some varieties have more than one name. I think the Ohio Junior is the same as the Early Ohio. The Eureka is identical with the Cobbler.

J. LOCKIE WILSON: Which do you prefer yourself, the white or the red?

HY. BROUGHTON: I prefer the red because I grow it and I think there is more money in it. It is a week earlier and it makes a considerable difference in the price. Some of our growers say they can grow a bigger crop of Cobblers than they can of Ohio. We have had them slightly mixed in northern grown seeds. But if we want to come to the Toronto market we have to grow white potatoes.

We plant by machine sowing the fertilizer at the same time about 3 inches deep. I think the Americans are ahead of us in gardening machinery. The way the planter is arranged it stirs the soil as you go along. There are two plows, the one makes a furrow for the potato the next furrow behind it comes about an inch

different and stirs up the soil. The fertilizer goes first and the next one plants the potato, and it goes an inch deeper than the fertilizer. Therefore, you are stirring it up and the soil is mixed with the fertilizer before the potato comes in contact with it.

After planting our machine ridges it up slightly. A week after we have planted them we take a lever harrow and harrow the ground thoroughly. A week later we put the weeder on drawn by one horse and we go over that. By that time the potatoes are showing themselves. We then put the double horse cultivator on and cultivate them down below the potato seed and just as close to the potato as we can. You can readily see the idea is to loosen up the soil, let the atmosphere in so that they make a faster growth. A week after we put the weeder on again. We keep that up until the potatoes are 8 or 10 inches high. My father is an old man and he told me last year that I would have them all pulled out, and I confess they were a pretty rumpled bunch of plants when I got through with them, but a few

Harvesting early potatoes. Photo by Hy. Broughton.

hours after you could not see we had been there. That eliminated all hoeing. We don't destroy any by the horses' feet, and the weeder teeth rake the ground pretty thoroughly. We cultivate about three times during the season. We keep away from the potato so as not to disturb the fine fibrous roots. The last cultivating is with the double horse cultivator. It turns the soil up slightly, possibly 2 or 3 inches. We don't hill them up. After that we prefer surface culture. We have found out by experience that the nearer you bring the potato up to the surface without being greened, the bigger crop you get.

We start digging with the expectation of getting 500 bags. It was that very fact that started the Sarnia Association. We found it necessary in loading carloads to have at least half a dozen men to do it. You readily understand that one man cannot dig 400 or 500 bags of green potatoes. You would injure the potatoes by keeping them too long, because they must be dug and marketed almost immediately. We found we needed the help of our neighbors. We went to our neighbors and formed an association. We were the first to organize in the co-operative movement in the Sarnia district. The needs of the case brought that movement along. Last

year we had something like 100 members and we shipped nearly $6,000 worth of potatoes out before September. The year before we tripled that amount. We start digging the third week in July, as soon as the potatoes are large enough, so we do not sacrifice our crop. We want them nearly full size grown. And taking one year with the other it is from the 18th to the 25th of July when we commence digging.

A MEMBER: When do you plant?

HY. BROUGHTON: As soon as we can, in March sometimes. That cleans up our early potato crop. The rotation of crops comes in right here. You get your potato crop off, say not later than the middle of August, you have then nearly one month wherein to prepare your soil, if it needs any, for your wheat crop, or, if your ground is not very clean you can summer fallow it, or you can sow late rape or turnips on it for feed.

A MEMBER: What do you dig your potatoes with?

HY. BROUGHTON: A potato digger. They all have potato machinery there. We get a wire one night, possibly to get a car ready the next morning. Six to ten men will put up that carload. You have to have your digger, bags and everything ready, otherwise you could not fill in such a hurry.

I am going to touch a little on my own personal work. In 1915 my yield was 176 bags per acre, dug while they were green. In 1916 my yield was 100 bags per acre, in the same condition. But, of course, the smaller yield was due to weather conditions; we expected it, but the extra price this year paid better than the big yield of last year. I will give you some figures on the cost of growing and delivering one acre of early potatoes.

Rent of land	$5 00
Twelve tons of manure and spreading at $1.50	18 00
Plowing	2 00
Harrowing	40
Five hundred lbs. of fertilizer—7½ per cent. ammonia, 15 per cent. phosphoric	9 00
Fifteen bushels seed at $1.00 per bushel, average price	15 00
Cutting seed, 15 bushels	1 50
Planting and sowing fertilizer	3 00
Harrowing after potatoes are planted, per acre	40
Three times going over with weeder	1 20
Spraying twice, 2 lbs. of Paris green at 25c., average price	50
Twenty-five cents per acre for work (twice)	50
Digging—team and a man (will dig 2½ acres per day) at per acre	2 50
Picking and bagging about 50 bags per day is a man's work in a fair crop	6 00
Delivery to car, 3 loads (this is on a basis of 150 bags per acre) 50 bags to load, $2.00	6 00
One hundred and fifty bags at 5c.	7 50
Cultivating 3 times, man and team at 1.00 per acre	3 00
Total	$81 50
150 bags per acre, and the average price for the last five years was $1.37	$205 50
Expenses	81 50
Per acre profit	$124 00

The work done and also the depreciation in machinery, are figured in at the prices I have given. If you think the cost is not enough, say in round figures $100 per acre profit.

J. LOCKIE WILSON: This is one of the finest addresses we have had on potatoes since we started the Ontario Vegetable Growers' Association. Mr. Broughton is ready to answer any questions, and I am sure his address is of great value to us all. There is this other feature that I think you should note—what organization has done for the Sarnia district. Mr. Broughton through his energy and enterprise and that of his associates has shown you what can be done by co-operative effort. They seem to have got the potato industry down to a satisfactory basis. Is there anything to prevent our branches all over this Province from doing what the Sarnia branch has done, perhaps not particularly along the line of potatoes, but along the lines they are engaged in. It would be advisable for you to ask Mr. Broughton, along what lines the co-operative movement is run, and the nature of their organization.

HY. BROUGHTON: We are not incorporated. We are working as a private company. Every member of that association has to sign an agreement which is quite lengthy, having about 30 provisions in it. It is simply an agreement between the grower and the salesman. The salesman is secretary-treasurer and manager of the whole affair. We started that way, and have never changed because the system has worked very smoothly. We have been advised to incorporate; there are legal reasons perhaps why we should, but we have not done so. In 1914, we shipped $32,000 worth of goods out, in 1915 not quite so much. This year, 1916, we have shipped $18,000 worth of goods.

F. F. REEVES: Mr. Broughton has valued the manure at $1.50 a ton. He gets his manure cheaper than we can in Toronto; we can get it for nothing, but the drawing costs us a good deal more.

HY. BROUGHTON: At the outset I said I was talking from the farmer's standpoint, not from that of the vegetable grower's. In Sarnia, we pay about 50 cents a load, and if we charge ourselves $1 a load to haul it out we are all right.

J. TIZZARD: You could not hire a team and put it on, even for $2 a ton.

HY. BROUGHTON: As to charging for spreading it, I hire a man by the year, and as he has no work to do in the winter except to attend to cattle, he can do it very well, and it is excellent for the teams.

A. MCMEANS: If you had to hire a team and man to haul that manure, you should charge that up in the expenses.

HY. BROUGHTON: Not in my case. I am talking from the farmer's standpoint. In the wintertime the man has that time to spare, and his team is practically idle.

A MEMBER: That man could get $5 a day for the services of that team.

J. LOCKIE WILSON: Yes, but the average farmer cannot get work for his team in the winter, and cannot get anywhere near $5 a team. From the average farmer's point of view, and as a practical farmer myself for 35 years, I know that you can get manure for 50c. a load.

F. F. REEVES: But can you take your team out and put it on the ground for $1.50 a ton?

J. J. DAVIS: I have a team—in fact I keep three horses on 17 acres—and all my team has to do from one year's end to the other is to cultivate 17 acres of land, and draw what manure we can get and coal for our winter's use. I have got to feed that team, whether they are doing anything or not. I could not get a job for them, but I have got to feed them just the same. And even figuring $5 a day for the team of horses, I can draw two loads a day, 2 or 2½ tons at a time, according to the kind of manure you get. Sometimes it is short and heavy

and sometimes it is long, and not so much weight to it. It does not cost me $2 a load, that would be $4 for the team and driver.

J. Lockie Wilson: If the farmers of this Province charged up $5 a day for their team for the work that they are supposed to do, I do not know how their finances would come out at the end of the year, and I can quite understand the point of view of the vegetable grower within five miles of Toronto; these men get $5 a day for their teams I am sure. From the point of view of Mr. Broughton, I do not think he has placed it too low.

Mr. Guthrie: From where I live I can easily figure on drawing 12 loads for $18, and Mr. Broughton lives closer to Sarnia than I do, and I should think that he can draw easily one load in the morning and one in the afternoon; that is, he can draw four tons in a day, and he can put it on his land for $18 an acre and pay a team $5 a day to do it.

Mr. Broughton is the originator of the Association in Sarnia. He can explain our co-operative work better than any man, and I can say that the vegetable growers of Sarnia for the last ten years have been doing so much better than they did before that we are going to keep on. In regard to northern potatoes, at Mr. Broughton's suggestion we have been getting one to three cars of northern potatoes, and we have, practically most of us, ceased to use our own seed.

J. Lockie Wilson: Have you any difficulty in getting cars when you require them?

Hy. Broughton: No.

Thos. Delworth: The growers near Sarnia must be exceptionally favorably situated to be able to get manure for 50 cents a team load. I had between 300 and 400 team loads hauled last winter. It cost me 80 cents a load. I live about 10 miles north of here, and have only hauled about 12 to 15 loads of manure since the frost broke up last spring. I am making contracts now for having manure hauled this winter. During the summer we can make better use of our time than in hauling manure, provided we can get the supply during the winter. You can go to the Union Stock Yards and they have several thousand tons, which they sell for $1 per load, and you can get it any time of the year. Now, as long as I can do that, I am not going to haul manure during the summer. In regard to hauling cost, I give a contract for hauling, $1.60 per load. Those loads average about 2 to 2½ tons, and the man can by working overtime haul three loads per day. As a general rule, he hauls two loads. The contract between us is that he can deliver 100 loads any time between now and the first of May. If he has a more profitable job he can go on with it. I am taking advantage of an economic condition and getting my work done cheaper. You can figure out the cost for yourself, $1.60 a load for hauling. I have paid as high as $2 a load for having it hauled. I pay for the manure besides $1 per load, that is $2.60 delivered on my premises.

Hy. Broughton: You are bringing it down to the city level, which does not apply in the average farmer's case. The average farmer in Ontario is land poor, because he is plowing and sowing and reaping more than he should do. He can't feed the land. He is mining it. The question of fertility in the soil is of very first importance. The gardener knows that, but the average farmer does not. They pay less attention to the manure and fertilizer end of it than they should do. They don't feed their land at all, and if they would supplement their manuring with a little fertilizer, they would get better results than they do to-day.

Moved by H. Broughton, seconded by E. Cook, "That the Vegetable Growers'

Association of Ontario, having in mind the great importance to the market gardener of the early potato crop and the difficulty of securing reliable seed, hereby respectfully urge the appointment of a specialist to undertake experimental work with this crop along the line of working out the best methods of producing high class seed, and also with the object of improving by selection or breeding our present varieties."

HY. BROUGHTON: There should be some move made in official quarters to do something to supply the present potato growers and the future prospective growers with good seed potatoes. Much money, energy and labor are being wasted by planting inferior seed, and additional work done with regard to potato growing amongst Ontario growers. There is no reason why Ontario should not export potatoes like New Brunswick does. If we had some reliable people in the north country to grow our potatoes, being supplied with the original seed, we would keep the money in our own Province.

THOS. DELWORTH: I thoroughly agree with the remarks that were made by Mr. Broughton. Our Association did some work along those lines a few years ago. We did not succeed in getting our supply of potatoes, still our experiment was a success, in so far that we got much information which might be of great use to anyone who takes up this work in the future. As some of you may remember who have been connected for some time with the Association, we got some seed potatoes and distributed them among farmers in Northern Ontario. We were to take the crop at a fixed price. In Northern Ontario the climate and the soil are right, but the difficulty we found was to get growers with proper conveniences to carry on this work. They have pioneer conditions up there, and we have not the machinery in the Association to take care of this kind of work. True, our Association might be widened, but it seems to me that it would be very much better if we could get the Government to take up this work, and we would be pleased if they would do so, and I think it would work better if we co-operated with the Department. The financing of the work seems to me to be outside of the work of the Ontario Vegetable Growers' Association. The distribution is another thing that makes a lot of trouble. We want the potatoes here early enough in the spring for our planting, and if we leave them until spring, there is great danger of spoiling the stock. Now some means has got to be provided whereby that stock can be shipped here in the fall before danger of frost, and they be stored here and distributed in the spring, because we find that while some will do it, it is impossible to get our growers to take the stock in the fall and hold it until spring. I have no doubt it could be profitably done, even though we would not save in dollars and cents, but it will pay us to get them true to type. I would be willing to contract for my next year's stock, but I do not think we have the means in our Association at present for conducting and financing it. During the experimenting a few years ago, Mr. Reeves and I undertook to distribute the potatoes, and they came down the first of the year. We had not very many and they were stored in my cellar. We got the orders and filled them, and shipped them away. We gave one or two day's work to it, for we are convinced it was a good move, and we were willing to give that time to it, to get the work along. I always find that when a man starts to do something for nothing, out of which someone else is going to make money, there is either a nigger on the fence or else someone is going to be dissatisfied and say: "He is getting something out of it;" so that if you want to get it down to a business-like and proper basis, get a man who is capable of doing it and pay him a salary. The experience the Association has had would be of great benefit to anyone undertaking the work in the future.

J. Lockie Wilson: In connection with what Mr. Delworth has said in regard to our experience; we bought good seed, sent it up to that north country, and found out, perhaps to our sorrow, that the men who received those potatoes were not quite practical enough in that they did not do the work that we thought they should have done. They did not understand the grading of potatoes, and got the varieties all mixed, the stakes having been knocked out and not replaced properly, and when the potatoes were received here the seed was mixed. It is of vital importance that the seed be handled only by careful practical men.

Mr. Guthrie: This is my second visit as a delegate. When I was here some time ago, the Toronto Branch took the lead in co-operative lines, but apparently not much advancement has been made. We have a town of some 8,000 population and about 100 gardeners to feed them. Mr. Broughton started our

Citrons.

Association. It was organized with three or four members. We did a little business with Port Arthur, possibly $3,000 worth. Then we extended our work to Toronto, London and Hamilton, and started to sell our potatoes and buy good seed stock. We have been getting good results from the seed we buy and poor results from what we save ourselves.

F. F. Reeves: We would like to have a man to look after the procuring and growing of good seed for the whole Province. I am willing to concede that you in Sarnia, so far as co-operation is concerned, are ahead of us. We could not sell our stuff the way you do. What we want to get is someone who is going to look after this thing for the whole Province.

J. Lockie Wilson: Mr. Guthrie is perhaps right, if we could all strike a Mr. Broughton to look after the branches of the business, but the great point is

this: we can produce as good seed in Ontario as can be brought from Wisconsin or New Brunswick, and it is the function of the Government to see that our men are educated to the point where instead of continually buying up carloads of seed, we grow our own.

Hy. Broughton: Where the Ontario Vegetable Growers failed in their seed potato experiment was that they did not take the whole Province or the different branches into consideration, and had the potatoes distributed through every branch, and every branch finance its own business. All we want is a method by which we can get Ontario grown seed potatoes.

J. Lockie Wilson: With the few bushels of potatoes that this Central Association could buy we could not furnish the quantities required to the different branches through the Province. That would mean the employment of skilled men to select them. We did not have the means nor the staff to do that kind of work. It was done through Mr. Delworth and Mr. Reeves, who did the work without remuneration. This was the very best possible thing that we could do at the time and it was on a very small scale.

Hy. Broughton: There is an Association in Wisconsin that makes a specialty of selecting seed, and growing hundreds of carloads of seed potatoes, sending them all the way from that country to Texas for seed, that is what we want in Ontario.

The motion carried.

THE PRESENT STATUS OF VEGETABLE NOMENCLATURE.

C. E. Durst, University of Illinois, Urbana, Ill.

It is unnecessary to state to a body of vegetable growers that great confusion exists in the naming of vegetable varieties, or as it is otherwise called, vegetable nomenclature. Anyone who has had much occasion to use American seed catalogues is aware of the conditions. The catalogues carry altogether too many varieties. A variety sold under a certain name by one seedsman is often found to be different from that sold under the same name by another seedsman. A variety offered under one name in one catalogue is frequently found under another name in another catalogue. The novelties, described in glowing terms and pictured in resplendent colors in the first few pages of the catalogues, all too often prove to be similar in essential respects to existing varieties and are sometimes actually inferior to them. Rarely do they prove superior to established varieties in any important respect. The names are, in many cases, entirely too long, being commonly weighted down by superfluous descriptive adjectives.

The result is that buying is made very difficult for the vegetable growers, and naturally there is a tendency for them to lose confidence in the whole seed question and in seedsmen in general. Most vegetable growers consider themselves fortunate, indeed, when their seed purchases meet expectations. The beginner is affected far more seriously than the experienced grower. Unless he has a good friend in the neighborhood, or asks his experiment station for assistance, he is at the mercy of the catalogues until he has had a couple of years' experience. With the large number of varieties catalogued, it is altogether unlikely that he will chance upon those which are most desirable.

As tangible evidence of confusion in vegetable nomenclature we might refer to some of the many variety tests which are on record. As long ago as 1885,

E. L. Sturtevant, of the New York Geneva Experiment Station, found that lettuce was listed under about 200 different names, but that in reality there were only about 50 distinct varieties.

Professor W. W. Tracy, of the United States Bureau of Plant Industry, in experiments conducted from 1897 to 1899, inclusive, found that there were 107 distinct varieties of lettuce, but that these were catalogued under 404 different names in American seed catalogues.

In later work with beets (1908—unpublished), Professor Tracy found 398 names listed in the various catalogues. Among these, he states, there were not over 50 distinct varieties.

It should be remembered that the above experiments were conducted a number of years ago. Undoubtedly conditions have become still more complicated since that time.

How the Present Confusion was Brought About.—The confusion is nothing more than might be expected when one considers the circumstances under which present nomenclature developed. As a body of men, seedsmen are interested in the sale of seed. Their success depends largely on their advertising. Competition is keen and they naturally incline toward taking advantage of any feature that will gain a point for them in the sale of seed. Changes in the names are viewed only from the standpoint of advertising value. Sometimes only slight changes are made in the name, and sometimes the name is changed entirely. Taken individually, these items may be small enough in themselves, but when allowed to accumulate from many persons, and through many years, one can readily understand why the present complicated conditions should result.

The multiplicity of names is brought about largely in the following manner. One seedsman introduces a new variety. It proves to be valuable. Other seed firms recognize its value, and, naturally, desiring to profit from the variety, they secure stock of it in some way or another, and propagate it. But they hesitate to catalogue the variety under the original name, not wishing to appear to be following in the first firm's footsteps. Consequently they select a new name and make it appear to the public that the variety is a distinct creation or introduction of their own. The writer has, in fact, been told directly by seedsmen that renaming is largely accounted for in this way.

The better the variety, the more abuses of this kind occur. The Earliana tomato, for instance, while not regarded as a tomato of high quality, most certainly must be conceded a high degree of merit from the standpoint of earliness. This variety is now sold under perhaps 30 or 40 distinct names.

Established Varieties Often Neglected in Desire to Introduce Novelties.—Many of our best varieties are becoming contaminated through the apparent lack of careful rogueing and through cross-pollenation with other varieties planted nearby. Again, judicious selection seems to have been neglected in some cases, since the type is often variable. To cite a specific example, it is well known that most growers prefer French-grown celery seed to American. It is generally conceded that French seeds are superior to American because of more thorough rogueing and greater care in selection. No doubt American growers could raise as high quality celery seed as the French, provided the same care were used. It appears that the maintenance of existing varieties in a high state of perfection by seedsmen, has, in many cases, been overlooked in the anxiety to introduce new sorts; indeed, some of the seed catalogues would suggest that some firms consider it a duty to introduce a few brand new sorts each year. The fact of the matter

is that there are already so many extremely good varieties that the chances of securing a new one of superior merit are very rare indeed. There is every indication that a splendid opportunity exists for the firms who will emphasize the perfection of existing varieties and their maintenance in uncontaminated condition.

NOMENCLATURE EXPERIENCES OF OTHER HORTICULTURAL ORGANIZATIONS.—It seems that practically all other branches of horticulture have given considerable attention to the subject of nomenclature. The most notable success has perhaps been achieved by the American Pomological Society. Fifty years ago the members of this organization were faced by practically the same difficulties that vegetable growers are having at present. In 1867 a set of rules was proposed to the Society by a Mr. P. Barry. A set of rules was adopted by the Society in 1883. These have been gradually improved as a result of experience, until at the present time the Society has in operation a set of rules which is universally recognized and respected in pomological and nursery circles.

The Society of American Florists has in operation a registry system that appears to be working effectively. Any firm or person having a new introduction submits the name and a full description of the variety to the Society's secretary, following which the same is published in a trade paper. If no objections are received within a stated period, the varieties are considered as registered. Attention has also been given to nomenclature by the American Carnation Society, the Sweet Pea Society, the Gladioli Society, and the Peony Society. The first has in operation rules designed to discourage in particular the practice of renaming. The latter three associations have standing committees on nomenclature.

At the present time, the American Association of Nurserymen, and the Ornamental Growers' Association are co-operating in regard to nomenclature and have appointed a joint committee in the matter. Mr. J. Horace McFarland, the well known nature photographer and civic worker, Harrisburg, Pennsylvania, is chairman. This committee proposes a joint meeting of all the various horticultural committees interested in nomenclature sometime in the near future.

BRIEF HISTORY OF THE VEGETABLE GROWERS' MOVEMENT.—Vegetable growers have given no attention to this problem until within the last few years. As individuals, they have recognized the complicated conditions for a long time, but as such, they were unable to accomplish anything. In 1908, the Vegetable Growers' Association of America was organized in a convention at Cleveland, Ohio. Like most young organizations, a few years were required for the organization to find its place before it could begin to attack the larger problems confronting its membership. In 1913, the subject of nomenclature was discussed at the Toledo, Ohio, Convention, and a committee appointed as follows: Professor W. R. Lazenby, Ohio State University, Columbus, Ohio, Chairman; Professor T. C. Johnson, Virginia Truck Experiment Station, Norfolk, Va.; Professor W. W. Tracy, U. S. Bureau of Plant Industry, Washington, D.C.; Mr. Eugene Davis, Grand Rapids, Mich.; and C. E. Durst, College of Agriculture, Urbana, Illinois. The writer was later selected as secretary of this committee and as such has taken a prominent part in the work.

The necessity of taking every step with extreme care soon became apparent. The problem is such a large one, and it has so many ramifications, that undue haste would undoubtedly result in mistakes that would obstruct rather than facilitate progress. Every forward step, the committee believes, must be based on a thorough understanding of all points involved and a just consideration for the interests of all parties concerned.

The first year was spent in making a careful study of the problem, and in drawing up a tentative code of nomenclature. This code was adopted at the Philadelphia convention of the Association in October, 1914.

The next important step consisted in opening relations with the American Seed Trade Association. This organization comprises in its membership 195 seed dealers. While its members do not handle all the garden seeds sold, their organization is the only national one representing the seed interests, consequently, the members play a large part in directing the trend of the seed business. Any serious movement regarding vegetable nomenclature must sooner or later take the American seed trade into consideration.

As a result of correspondence, President C. C. Morse, in his President's Address to the American Seed Trade at San Francisco in June, 1914, recommended the appointment of a committee to co-operate with that of the Vegetable Growers' Association. The committee was later appointed by the following Presi-

Cos lettuce.

dent, J. M. Lupton, and consists of the following gentlemen: Mr. H. G. Hastings, Atlanta, Ga., Chairman; Mr. Leonard H. Vaughan, Chicago, Ill.; Mr. Keeney and Mr. Arthur B. Clark, Milford, Conn.

After exchanging considerable correspondence in an effort to become acquainted with each other's viewpoint, an all-day joint conference of the two committees was held at Columbus, Ohio, on December 30, 1915. Tentative agreements were reached toward the close of the day regarding several of the main points involved, though much difference still existed as to how the details would be worked out.

The President of the American Seed Trade invited a member of the vegetable growers' committee to present their side of the matter at the Seed Trade Convention at Chicago, in June, 1916, and the writer was asked to perform this duty. My paper was preceded by the report of Mr. H. G. Hastings, chairman of the Seed Trade Committee. On the whole, this report was favorable toward the contentions of the vegetable growers. Following the reading of my paper, there was an extended discussion. As might be expected, this discussion was unfavorable to the vegetable growers. It was the first time that nomenclature had ever been openly discussed on the floor of a Seed Trade Convention, and it was natural to expect that opposition would be shown by seedsmen who had never had the matter

presented to them in a serious manner before. The writer could not fail to reflect that their attitude was precisely the same as that taken by the members of the Seed Trade Committee when we first began work on this problem, and our work with that committee lends credulence to the belief that many of the seedsmen will be more favorable toward the contentions of the vegetable growers after they have had time to consider the matter more fully.

Following the example of the Seed Trade Association, our Association invited a member of the Seed Trade Committee to present their views regarding nomenclature at our convention in Chicago in September, 1916. Mr. L. H. Vaughan read a paper largely prepared by Mr. H. G. Hastings, Committee Chairman. A lengthy discussion followed this paper, which, of course, was more or less unfavorable toward some of the points mentioned in the paper.

Principles Adopted by the Vegetable Growers' Committee.—In its relations with the American Seed Trade Committee, the Vegetable Growers' Committee has adopted much the same principles as those followed by the American Pomological Society, with certain modifications in details to fit the case at hand. Briefly, these are as follows: A name should contain as few words as possible. It should be distinctive and suggestive of the variety for which intended. The rights of the originator and introducer should be protected. A name already in use for one variety should not be used for another. A name, once given, should not be changed. The number of varieties catalogued should be as few in number as possible. If these various principles were once brought into working order, they would bring about a standardization of names in the various seed catalogues, a matter which is most earnestly desired by the vegetable growers.

In the last analysis, the whole proposition revolves around the point as to whether or not vegetable growers have any rights regarding the form and stability of the name. In other words, do the seedsmen retain possession of the name after the name is produced, and can they do anything with it they wish, regardless of the effect on the operations of the buying public? From statements made by some of the seed dealers, this would appear to be their viewpoint. If the seedsmen do own the name and the growers have no rights whatever in the matter, then we may as well proceed no further, for it is a waste of energy to proceed with hopeless tasks.

The growers, however, cannot and never will, agree with this viewpoint. They believe that so long as a seedsman, or any other person for that matter, has a variety under test, or is growing it for his own use, he should have the right to call it anything he wishes, or to change the name as often as he desires. As soon as the variety is introduced to the trade, however, the name automatically becomes the general property of the buying public, who are entitled to some interest in the form and stability of the name. In other words, seed dealers release private ownership of the name when the variety is offered to the public for sale.

As to the name chosen, we do not ask, of course, for the privilege of naming the variety. But we desire that the name meet certain qualifications, and that all seedsmen use, and continue to use, the same name for a given variety. No one, not even the seedsmen, should have the right to change the name. The variety name, once given, should be as inseparable from the variety itself, as a handle is from a pitcher.

Analysis of Some of the Points of Difference.—Vegetable nomenclature should not be compared with that of lifeless manufactured products. In the paper read by Mr. Vaughan at Chicago, Mr. Hastings likens vegetable nomenclature to

that of manufactured articles. Cigar manufacturers, canning companies, and others, he stated, rename their products to hold trade, though no specific instances were cited. But why choose such widely different objects for comparison? Why not compare the nomenclature of vegetables, not with that of lifeless manufactured products, but instead with that of other things possessing life or capable of developing into life?

Let us compare the case to that of breeds of animals, for instance. Suppose a breeder of English Shire horses tried to sell some of his animals under other names. Suppose the breeder of Chester White hogs tried to change the name of his stock. Suppose a poultry breeder tried to sell Plymouth Rock hens under another name. In none of these cases and many others which might be cited, do the producers pretend to have full right to the name simply because they own a few of the animals. The fact of the matter is that the name is such an inseparable entity from the particular breed itself, that no one even considers the matter of making a change, and any one who attempted to sell any breed of animals under a different name would probably be brought into court speedily. Instead of renaming, the producers of live stock emphasize their particular strain of that breed, which is most certainly legitimate from any point of view, and is good advertising policy as well.

Length of the Name.—As to the length of name, the Vegetable Growers' Committee feels that it should not consist of over two words, including that of the introducer or originator, if it is especially desired to prefix the latter. While the Seed Trade Committee admit that many of the names are now too long, and even suggested to their organization that the names be shortened, they favor a more liberal use of adjectives. They maintain that a certain amount of descriptive matter is necessary in a name in order to enable the home grower, who is not so well acquainted with the different varieties as the commercial grower, to grasp the characteristics of the variety readily. They claim that a home grower can often get a better idea of a variety from a few well chosen adjectives, than from a half page of fine print. We admit that in some cases this may be true, since it is commonly very difficult to get much of an idea of a variety by reading the fine print. Furthermore, the descriptive matter in the fine print and in the name often do not coincide.

As to the home growers not knowing varieties, we feel that this allegation needs to be qualified. Take the old standard varieties like the Early Ohio potato, Alaska pea, White Strassburg radish, Evergreen sweet corn, and many others which might be named. How many home growers are not acquainted with these varieties? No long string of adjectives is needed in these cases. Why should they be needed in other cases?

In regard to many of the newer introductions, we fully agree that a home grower may not be so well acquainted with variety names. However, we believe that this is very largely due to the fact that the various seedsmen do not leave the names long enough in the same form to enable the home growers to become acquainted with the variety under that name.

Names Selected From Standpoint of Home Grower.—In attempting to justify a liberal use of descriptive adjectives, Mr. Hastings, in the report read by Mr. Vaughan, stated that the great bulk of the seedsmen's trade came from home growers, and that the trade of commercial vegetable growers constituted only a small part of the whole. Hence, he reasoned, names should be selected largely from the standpoint of the home grower, and that a commercial grower, therefore, cannot expect much consideration in the matter.

Now, if this is really the attitude of the seedsmen, it represents a most deplorable state of affairs from the standpoint of the vegetable growers. Certainly, representing the volume of business that they do, vegetable growers are entitled to some consideration in the matter. According to the United States census of 1909, the vegetables raised on farms reporting a product valued at $500 or more, were valued at $60,104,504. These figures do not include potatoes, sweet potatoes, and yams. The quantity of seeds required to produce a product of this value undoubtedly deserves some consideration on the part of the seed dealers.

We cannot help but feel that Mr. Hastings must have been judging from the standpoint of his own firm when he made these statements, rather than from the firms at large. His business is located in the south where conditions are no doubt quite different from those prevailing in more northern sections of the country. That some firms, at least, regard the trade of the commercial vegetable growers as of some importance is shown by the fact that some of them issue market garden catalogues and maintain special agents among vegetable growers in the field.

Are Vegetable Growers "Bargain Hunters?"—In the paper read at Chicago, Mr. Hastings accused vegetable growers, in rather strong terms, of being bargain hunters; of not being willing to pay prices commensurate with high quality seed. Nineteen out of twenty disappointments in seed purchases, he claimed, were due to the practice of bargain hunting, etc. This attitude, we believe, is largely unwarranted on the one hand, and entirely off the question on the other.

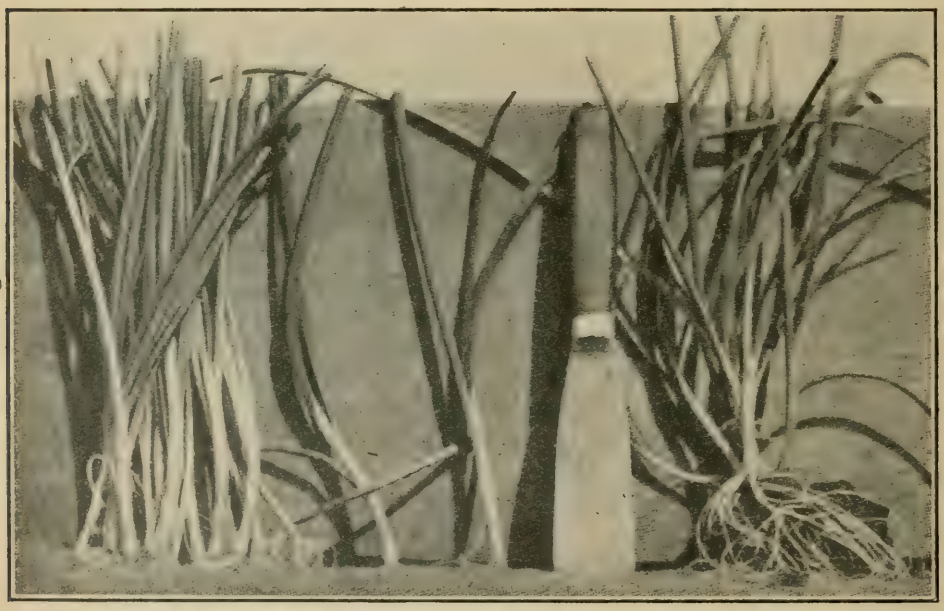
As to bargain hunting, the seedsmen no doubt often judge the gardener as a bargain hunter when he buys part of his seeds from one firm and part from another. The fact of the matter may be that he is buying his various seeds here and there from different seedsmen, according to which furnished him the best seeds of certain vegetables in past seasons. It is safe to say that nearly all the best growers split their seed orders in this way. No doubt, there are some growers who are really bargain hunters, but without a doubt, these are greatly in the minority.

As to growers not being willing to pay the prices commensurate with high quality seed, we believe this is at variance with the facts. The agricultural experiment stations, farm papers, and other agricultural institutions have persistently taught for years that the best seeds are always the cheapest, and that a few cents extra invested were quickly compensated for in larger yields. In fact, this feature has been emphasized so much and has been so generally accepted by growers that many seedsmen have apparently taken advantage of the situation and have sold seeds for prices way beyond their real value. An examination of almost any of the seed catalogues will reveal the fact that many seeds are sold at what might fairly be called very high prices.

So much for this side of the matter. In regard to the "bargain hunter" question being off the subject, let us understand that the points at issue concern nomenclature only. The Vegetable Growers' Committee was not appointed to go into the matters of adulteration, germination, purity, etc., matters which primarily affect prices. It was appointed distinctly for nomenclature purposes, and it has confined itself strictly to that phase in its relations with the American Seed Trade Committee. Surely it will not cost the seedsmen one cent to cut off the descriptive adjectives, to discontinue renaming, and to standardize the names used in various catalogues. Consequently we fail to see the bearing of this part of the paper on the subject under discussion.

Mr. Hastings, without being specific, makes a general statement that American gardeners practice renaming themselves, referring in a general way to the sale of melons. We do not know of any specific case that would bear out his point, but, even granting that it be true, the vegetable growers as a body cannot be held responsible for the acts of a few isolated persons in the business, any more than the seedsmen can be held accountable for the acts of all seed dealers, whether they be members of their organization or not.

Buying Seeds a Year in Advance.—The suggestion has been made that the vegetable growers buy their seed a year in advance and test it out on a small scale, following which they can discard the seed if it does not measure up to expectations. This plan might prove feasible for such crops as celery, lettuce, cabbage, tomatoes, and a few others, the seeds of which plant a large acreage for a small outlay. But it would not be a workable plan for such crops as beans,



Onion prickers.

peas, etc. Furthermore, there is no reason why the responsibility for testing should be placed on the growers, or that they should be financially responsible for seeds which do not test out favorably. Certainly, every seedsman should know that his seed is good, and of the proper variety, before it is sold.

Does the Vegetable Growers' Association Represent a Select Class?—The Seed Trade representatives have contended that the Vegetable Growers' Association represents only a select class of vegetable growers. It does not, they allege, represent the rank and file of the growers over the country. We admit that the organization does not contain in its membership all of the commercial vegetable growers in the country. We might answer that neither does the Seed Trade Association contain all of the seedsmen. There can be no doubt, however, as to the representative nature of the Vegetable Growers' Association. It includes, to my personal knowledge, growers of all kinds, varying from those who work a hundred or more acres down to those who work only two or three; from those

who have ten acres under glass, to those who have no greenhouses at all. It has members in all parts of the country, and many in Canada. A claim that it is not representative, therefore, is altogether unfounded. One needs simply to attend one of the Vegetable Growers' Conventions to be convinced of this fact.

Even granting, for the sake of argument, that the organization was not representative, it is a well known fact that growers everywhere, as individuals, have held these same ideas regarding nomenclature for many years, and anyone could quickly recognize this feeling if he went about much among the growers. It is a surprise to us that the seedsmen should even raise this point. The fact that they have raised it would seem to indicate that some of them, at least, do not keep in very close touch with the thoughts or opinions of their customers, a matter which most progressive business houses nowadays regard as of very great importance. During the last ten or fifteen years one needed merely to mention the subject of nomenclature among vegetable growers and he would immediately evoke vigorous discussion. As definite tangible evidence, one might cite just such growers as you, who are willing to pay a man's expenses all the way from Urbana, Ill., to Toronto, Ontario, to hear his thoughts on the subject.

How Seedsmen Justify Renaming.—In the paper delivered at the Vegetable Growers' Convention in Chicago, Mr. Hastings makes the statement that "renaming is not a vital problem, and that there are few instances of its practice in recent years by the leading seed houses." It appears that this position weakens when one considers how tenaciously the seedsmen cling to synonyms now in use. It would not be a difficult matter for the members of the Seed Trade to come together on a common name in many cases where several now exist, but, from present indications, it is not likely that they will do this.

In this connection, Mr. Hastings speaks of giving the writer a viewpoint which he did not realize before. If I showed any change in manner, following his explanation, it was probably because I had received further enlightenment regarding the reasons for which renaming is justified. The case which Mr. Hastings refers to, I presume, is that of the Earliana tomato. Mr. Hastings stated that the Earliana did not meet with favor when first introduced in the south. His firm secured an improved strain, he states, and changed the name to "Hastings New Extra Early Prolific," under which name a trade was developed.

Even these circumstances do not justify renaming. The mere fact that the Earliana tomato, which Mr. Hastings did not introduce or name in the first place, did not meet with favor when first introduced in the south, should not justify him in changing the name. Again, the fact that the variety was renamed, and that a trade was developed under the new name, does not prove that the trade would not have developed if the same amount of advertising had been given the variety under the old name. It seems that if Mr. Hastings had emphasized the fact that he had succeeded in securing a highly improved strain of the Earliana tomato, as several other seed firms have done, he might have secured as good a trade as he is now enjoying.

The statements in regard to renaming being a thing of the past weakens further by the statement that the seedsmen "are inclined to think they would do it again under certain circumstances," as stated in Mr. Hastings' paper at the Chicago Convention.

A case somewhat similar to that cited by Mr. Hastings, was that mentioned by Mr. C. E. Kendall at the Seed Trade Convention in June, 1916. He stated that Golden Bantam sweet corn was formerly sold under the name Gold Coin,

but that it did not meet with success under this name. Mr. W. Atlee Burpee, he states, recognized the merits of the variety and changed the name to Golden Bantam, following which the sales increased rapidly. It should be remembered that the Burpee Seed Co., conducted a most strenuous advertising campaign in connection with this variety, and it is a question whether this advertising was not responsible for the increased sales rather than the changing of the name. With the writer, it is an open question if the same success could not have been achieved by using the same amount of advertising under the old name.

It appears, therefore, that while the seedsmen state that renaming is not practised by the leading seed firms, they still justify the practice and suggest that they will rename again under certain circumstances. Now, as long as this is their attitude, we are not likely to have any marked progress in vegetable nomenclature. For as long as renaming is justified on the ground of a name being a poor advertiser, or the variety receiving a black eye in a certain locality, renaming will occur, no matter whether it is actually done for these specific reasons or not. The name should be selected with extreme care so that changes will not be necessary. If a name later proves unfit, then the seedsmen should take the consequences of their own mistakes and not complicate things for the buying public by attempts to rectify the mistake later.

Effect of the Section on the Seed and on the Crops.—Seedsmen contend that there is a great deal of variation within varieties due to the section in which the seed is grown and to the section in which the crops are grown. As to the first, there are many carefully conducted tests on record which show that heredity is the dominant factor in determining the characteristics of the progeny, and that environment has very little to do with it. The transmission qualities of the seed would be affected only when climatic conditions are so adverse to the proper development of the plant, that its genetic constitution is modified, and it is undoubtedly very rare that this takes place. Vegetable seeds are grown in sections especially congenial to their development, consequently there could be little, if any, effect of this kind.

As to the section where the crops are grown, this might have some influence on growth and size characteristics, depending upon whether climatic conditions were favorable or unfavorable to the species in question. For instance, the egg plant, which is a warmth-loving crop originally introduced from the tropics, would produce much better results in Florida than in North Dakota. Celery, which likes a cool moist climate, would do quite differently in the muck soil of Michigan from what it would do on the plains of Nebraska. Certain root crops would develop differently in different types of soil. But such wide contrasts do not often obtain in practice, since it is not profitable to grow crops under climatic and other conditions which are unfavorable to their development. Each crop has its special likes and dislikes, and the growers so time their plantings that a given crop is given much the same weather conditions in various places. If crops cannot be given somewhere near congenial conditions, growers do not as a rule find their culture profitable and they are not grown. Given practically the same soil and weather conditions, no matter whether it be in Oregon or on Long Island, in New York or in Michigan, in Ontario or in Washington, there is every reason for believing that there would be little difference in a given variety with respect to even growth and size characteristics.

However, even when the same vegetable is grown under even quite different climatic conditions, it is only the growth and size characteristics which are affected.

Golden Self-blanching celery will still show the characteristic lack of chlorophyl in some of its stems and leaves, no matter where grown; the New York Purple egg-plant will still be purple, and the Globe tomato will still be pink, no matter where grown; and the red tinge of Big Boston lettuce will be present, no matter whether grown in Nova Scotia or Florida. Most varieties carry several of these distinguishing characteristics by which they may be readily recognized.

How Shall the Problem be Solved?—So far, the question has not passed beyond the controversial stage. The next important matter is to take definite steps toward bringing about the desired reforms. Two lines of action present themselves. First, what can be done, if anything, to straighten out the present confusion, and second, what can be done to prevent confusion in the future?

Existing Conditions.—As to existing conditions, it may not be possible to accomplish a great deal, for most certainly a great deal of friction would result if we attempted too rapid reformation. If we can adopt steps to prevent confusion in the future, it is believed that present conditions will take care of themselves in time.

We are hoping, however, that it will be possible to induce seedsmen to drop off many of the superfluous adjectives in present nomenclature so that greater uniformity in the various catalogues may be brought about. While it may be expecting a great deal, we are hoping also that some of the seedsmen may be induced to adopt a common name in cases where many now exist. If they will not do this, possibly they will be willing to include in the catalogue description a statement that the variety is a synonym of another variety, an improved strain of it, or the like.

Preventing Confusion in the Future.—Looking to the future, one of the first necessities will be a lot of variety testing. This should be carried out in different places to determine climatic effects, if any, and for more than one year to ascertain seasonal differences. In this connection, I might state that 21 experiment stations of the United States offered their assistance in this direction some time ago. At that time it was expected that the testing would be carried out immediately, but before it was actually started, we decided to defer it until a more complete understanding was reached with the American Seed Trade Committee. While some of these promises may have lapsed by this time, due to their not being taken advantage of at once, it is believed that most, if not all, of the stations will give their co-operation when it is desired.

Testing in several sections will enable us to learn the behavior of a variety in different places, its limits of variation, its adaptability and value for different sections, and other characteristics.

While it would be desirable to test all the varieties of a given vegetable catalogued, this may not be feasible, in view of the many synonyms. If this seems the case, it will probably be well to limit the testing to a few of the standard varieties of each vegetable with a view toward establishing types of these for comparison with future introductions.

Undoubtedly, this testing will need to be placed in charge of a competent authority whose views are unprejudiced, and whose findings, therefore, will command the respect of both seedsmen and vegetable growers. The United States Department of Agriculture would seem to meet these qualifications and the question remains as to whether or not it could be prevailed upon to undertake this important service.

If the Department of Agriculture cannot be induced to accept this respon-

sibility, it may be that the various experiment stations can find some way to carry out the work.

Of course, details for the testing must still be worked out and necessarily the authority which assumes charge should have a large voice in this matter. The idea which at present seems to meet with most approval on the part of both the Seed Trade and the Vegetable Growers' Committee, is to adopt some policy of registration and certification.

Wax beans.

The plan proposed by the vegetable growers' committee is as follows: A proposed introduction would be submitted for trial and registration. In comparison with existing standard varieties it would then be tested out. If it proved superior to them in some important respect, as determined by the board or authority in charge, registration would be allowed and the variety would be duly "certified."

Conserving the Rights of the Originator and Introducer.—In this connection, it would be necessary to protect the rights of the originator or introducer, who should have full credit, both in regard to priority and with respect to the extra profit that is justly due him. We would hardly expect an originator or introducer to offer some of his stock to any authority for trial and take even

the slightest chance of having that stock fall into the hands of competitors. To protect him fully, our plan would be to allow the introduction of the variety to the trade at the same time it is offered for testing, either under a temporary or the permanent name. If the variety proves worthy of registration, well and good, the seedsman would then have undisputed priority; he would have the lead of his competitors and so could reap the profits due him; and the final certification of the variety should prove a valuable asset from an advertising standpoint. If the variety does not test out satisfactorily, then he has nothing to lose.

Conclusion.—From the statements which have been made, it is apparent that rather wide differences of opinion still exist regarding the details for standardizing vegetable nomenclature. In the main points, however, the two committees are fairly well agreed, as also that some of the descriptive adjectives should be dropped, though the seedsmen are not as yet willing to reduce the name to a one or two-word basis, as contended for by the vegetable growers' committee. The seedsmen are agreed that there should be greater uniformity of the names in the various catalogues. They also agree that renaming, as a general practice, should be discontinued, though they justify it in the future under certain circumstances. It is a long difficult task that is before us, but by keeping persistently at it, it is believed that results will in time be accomplished. In the meantime growers should support the movement in every way possible. They should make their seed purchases carefully, avoiding firms who are flagrant abusers regarding vegetable nomenclature. Furthermore, the vegetable growers committee asks that they be patient.

Prof. Crow: It always seems to me that there is a great deal of justice from the seedsman's standpoint in regard to the commercial vegetable growers' views of the seed trade. This has been discussed time and time again by the fruit growers in connection with the nurserymen. The fruit growers have reviled the nurserymen for years for duplicating names, for not making a special effort to grow fruit trees for the commercial fruit grower. The nurseryman for the most part has kept quiet and let it go on, but when you know the inside of the nurseryman's case, you know there is a reason for him to keep quiet, not that he has any underhand methods. There are two classes of growers served by nurserymen, and by the seed trade, that is to say, there is the commercial grower who wants the best fruit tree he can buy, and he will pay the price. On the other hand there are a very large number who buy an apple tree and don't know one variety from another, or the difference between a one, two, three or five-year-old tree. They buy the tree, mainly on the strength of a beautiful colored illustration in the agent's book. The bulk of the nurseryman's trade is made up of small orders, from people in towns and cities and villages and the country districts, who are planting just a few trees at a time. You have no idea of the number of fruit trees sold in Toronto every year. Those people pay good prices for their trees, and they make up, I should say, 75 or 80 per cent. of the nurseryman's business—that is to say, small orders to small planters all over the country. Now a fruit grower can go to a nurseryman, pick out what he wants and pay the price and get good satisfaction, but that is because the nurseryman has quantities of stock there. You have the same situation here. You have those who are interested in quality of the seed first. You know that price does not stick you. But the seed trade is made up just exactly like the nursery trade, of thousands of small orders from other people, who scarcely know cabbage from cauliflower, or cabbage from turnips. The ordinary small gardener of every small town, city and country, wherever you find gardens, constitutes the

big part of their custom. The inexperienced grower who does not know vegetables or seeds, forms the larger percentage of the seed trade. The solution of this matter from your standpoint is up to somebody who will make it a point to grow seeds for you, who will make a specialty of your requirements, and who will not try to revolutionize the seed trade. I think myself that there is now, and there will be in the future, an opportunity for some man in Canada, say in Ontario, to go into the growing of certain lines of seed, the kinds that you want, for instance. I don't know why somebody should not make a business of supplying men with strictly high-class Golden Celery Seed. He could make money out of it at the price you would be willing to pay, certainly he could make a good thing out of it. I have had some experience along that line, and I have been able to secure as high as five pounds of seed from five plants, and one pound of celery seed is worth $1.50 an ounce and up. Figure it out. There is money in that. I don't know much about cauliflower. I have not had much experience, but I don't see why there is not an opportunity for some one there too. There is an opening for the best grades of onion seed. As to some of the cheaper seeds like beet, I do not know how much of a margin, or how much of opportunity there is in their growth. Some day that thing will be worked out by a grower, or else it is going to be worked out by some seedsman, who will go into the thing and cater especially to the market garden trade. Some seedsmen are beginning to do it already, but the bulk of the seed trade never will, and you will never get the seed you want from the seed trade in general, any more than the fruit grower will get the kind of fruit tree he wants from the nurseryman, unless someone will make a specialty to secure it for him at a special price.

Your problem has three corners, or three phases—one is nomenclature, dealing with the names, and there is certainly a lot to be said for the arguments presented by Prof. Durst with regard to limiting the number of names that one variety can be known by. I think, however, we understand that point very clearly, its significance and its application. Then there is the point of standardizing of type. It strikes me, here is a matter of very considerable importance. Along with that I would consider the question of the quality of seed which I have just discussed. Now the quality of the seed is the foundation of the whole thing. If you can get the right quality of seed, of course of the right variety, you have got what you are after, and you might say that nomenclature and standardization are already settled.

The man who knows most about this business in Canada is our good friend, Mr. McMeans. Mr. McMeans is now in the employ of the Dominion Seed Division, making it his special business to find seed growers who will try out seed growing here. They will have to be new men, of course, because there are not any men in this country who have been following up that line, but he is making it his special business, and is trying to find men who will.

He goes farther than that, and is successful in placing with the seed trade the seed which is being grown, and which will be grown in Canada. If he will tell you what he is doing from day to day, you will see that this thing is moving forward. Standardization is on the way. As to taking up what Prof. Durst suggests in trial ground work, that is good work. I have found in my travels that the men who know varieties of vegetables prepare our work for the seed firms. They are in charge of the trial grounds of the seed firms. If we can have our Government institutions take up trial ground work systematically and test out the results properly, it will be good; it will take time to cover the crops there are, but still we can cover one crop in each institution, and then if we can establish standard

types of celery, cabbage, cauliflower, etc., we will have something that we can put into the hands of those who want to grow seed. We can say there is the accepted variety type, there is the standard, and moreover, I hope and I expect that Mr. McMeans will be able to put into your hands stock seed, high grade, pure-bred, or as near to it as you can get of those things.

A. McMEANS: Everybody present who has had any experience with seed firms will know how hard it is to get any reliable information, and it has been slow, up-hill work to gain the confidence of seed firms, to get the information to work on. We have no trial grounds in this country that we can use, and I have been availing myself of trial grounds on seedmen's farms. I will give you an instance of what I saw about where seed grows, or where it came from. This was

Gooseberries—A favorite English small fruit, which is becoming more popular in Canada.

in peas. The seed stock was originally grown in Michigan, it was sent to California, Idaho and Wisconsin and grown there. A year later a sample was brought back and put on the trial grounds of Michigan. How much difference was there between the three stocks? You could find almost as much difference as you could in three different varieties. Our California seed was a week earlier and 6 inches dwarfer than Wisconsin, and the Idaho seed was a week earlier and 6 inches taller. Now there was that much difference just in the one season, so it is necessary when you are buying peas to know where your stock is grown. Take a pea that will take sixty days here to mature a crop fit for table use. In Idaho or Montana it will take eighty on account of the slower growth. Find out all these differences when you can arrive at a basis to work on. I have taken it upon myself to talk the matter over with Prof. Crow, and with Mr. Palmer, of Vineland Station, to do some work along standardization, to render assistance in the matter. So far we have got to where Prof. Crow is making tests on beets and onions, and

Mr. Palmer on tomatoes. This work is to be carried along at least three years. We have gone along slowly, in getting into the good graces of the seedsmen, until at the present time, I have got one or two firms that are quite willing to believe that 50 per cent. of their orders for fruit and vegetable seeds could be grown in Canada. The thing is now to find responsible growers to grow those seeds. There is no reason why we, in a country like this, with a climate as varied as ours, cannot find a spot that will grow good onion seed in Ontario successfully at a basis that will pay. That vegetable growers will pay for seed, has been fairly well demonstrated. We can grow our stock seed here, because seed men do not care very much how much their stock seed costs, so long as it is right. And we can move it out to some of the valleys of British Columbia, and bring it back here to our seed firms. And that is the basis we have got to work on. You pick up the seed catalogues to-day advertising Eastern grown onion seed. There is not enough onion seed grown in the east to supply one seed firm. If there is, I want to know where it is grown. I can't find it. We can grow seeds, I claim, as well here as they can in Michigan, but we have got to have somebody who has enough enterprise in him to put in the necessary machinery. We have one seed firm, at least, that goes after the onion grower's trade through Ohio and Michigan, and that same seed firm sells to the small seed dealers through the country, but yet they go after that trucker's trade, and nobody says a word about it, and there is no reason why we can't build up a business in this country. Somebody some day will have nerve enough to do it, and go after it and make money, and people will wonder why somebody did not do it before.

CELERY.

CHARLES SYER, BARTONVILLE.

In order to produce a first-class crop of celery, it is advisable to make sure that the seed is of the best quality obtainable. I prefer French grown seed, and use it whenever it may be obtained, the variety used most extensively being Paris Golden Yellow.

I always make it a practice of securing my seed a year ahead, and test this out by planting a small quantity, and am able to prove to my own satisfaction that I have the type that I want.

Having no green house, all my celery is planted in hotbeds. The soil in these beds is of a sandy loam, having considerable sand mixed with it. This soil is used for one year only, as I have found new soil produces stronger plants free from disease. When the beds have been prepared, and the soil raked down even, they are allowed to stand for three or four days, so that all weed seeds may germinate, and the temperature of the bed has become normal. These young weeds are destroyed, and the bed is then ready for planting the celery seed. A mark is made with the edge of a lath, and the seed is sown in this drill at a depth of ¼-inch. The seed is then covered with a thin layer of fine sand, two thicknesses of newspaper being laid over this, to hasten germination of seed, and prevent the soil from drying out. As soon as the seed germinates the papers are removed.

It is important that the hotbed be carefully ventilated to prevent damping off, and the sash should be raised on the opposite side to that from which the wind is blowing.

When the seedlings are ½-inch to an inch high, they are transplanted into other hotbeds, about two or three inches apart. They are carefully attended watered, cultivated and ventilated until they are large enough to be transplanted to the field.

In planting out of doors, I pay particular attention to the cultivation of the soil, so that it is in a fine condition, free from any lumps. I plough down from 50 to 75 tons of manure per acre each year, and also use about 1,000 lbs. of ground bone to the acre; planting is usually commenced the first of June, the plants being set in rows three feet apart, and in the row 6 inches to 8 inches apart. I use my hand for making the hole for the plants and press the soil firm well around the roots. Cultivation is kept up to keep the soil in a fine condition. Nitrate of soda at the rate of 200 lbs. to the acre is applied two or three times in the season, in order to hasten the growth.

When the plants have reached the marketable size, they are bleached with 12-inch boards. These are set along each side of the row, and are held close to the plants by means of stakes driven in at the ends of each board. In from ten days to two weeks the hedge will become well bleached and ready for market.

We commence spraying in the seed bed, and use bordeaux mixture 4-4-40, with a knapsack sprayer, as fine a spray as possible being used on the young seedlings. After the plants have been set in the field, we use a barrel sprayer, covering four rows at a time, three nozzles to a row, so placed that the mixture is applied to the sides of the row; this is continued each week until the boards are set up.

For late celery the variety Evans' Triumph is used, and seed for this is planted in a clean piece of black muck. After it has been in the rough leaf it is thinned out, so that eight or ten plants are left to the inch. We usually set these plants out in the field about the middle of July.

Each year I store considerable celery for winter trade, my storage house being built to hold 30,000 to 40,000 heads. We start packing the celery in the corner of the building, and stand it straight up and cover the roots with a little loose soil. The plants are set as close together as possible, and a few days after they have been set, they freshen up, and some growth takes place while in this house. This celery is usually sold about Christmas season, and brings in about 30 per cent. more than would have been received in the Fall. The main point of storage of celery to my mind is the regulation of the temperature to as near freezing as possible, and this is done by means of control of ventilators located in the roof of the storage house.

IRRIGATION.

T. M. Mulligan, Ottawa.

I have been asked to say something on a feature of vegetable growing, which has been receiving considerable attention the past two or three years, and in which I have been experimenting for some time, that is overhead irrigation. It may be thought out of place for a comparative novice like myself to advance any improved or new ideas regarding vegetable growing in a gathering of experts, in that most interesting and useful department of our national industry; but I take it we are all here to learn, to give and take of our experiences in our varied methods of vegetable

growing, and in the wider and equally interesting and valuable field of horticulture, and realizing that a building is made up of its parts and though some of these parts are small, it nevertheless takes all to complete the structure, I therefore take courage to present my limited experience in this particular phase of our common work. It may be said that with proper location and soil, the vegetable grower may with careful cultivation and intelligent selection of what to grow, manage to have a fairly satisfactory balance to his credit at the end of the year; but there are periods in most seasons when the drought is so great that it is most difficult to save some crops from partial ruin on account of lack of moisture, and, should the dry season be prolonged, complete ruin is almost certain. This serious state of affairs may now be overcome by the overhead system of irrigation.

Some four years ago my attention was directed by conversation and reading to this method of irrigation, and I became so impressed with its value in overcoming the lack of moisture conditions in any extensive vegetable growing that in the autumn of 1913, I started the erection of an overhead system of irrigation on my own grounds. I secured a Gould's single acting triplex pump. Now this pump for irrigation work cannot be improved upon, and let me advise anyone contemplating installing an irrigation plant to get a pump sufficiently large and powerful to do present work with ease, and also fit to meet your wants should you wish to extend your plant. Having placed the motor and pump I ran my service line through the centre of the field so that irrigation lines run right and left off service line. The pipe lines with nozzles attached are 50 ft. apart running parallel. Each line is placed on 1¼-inch black iron pipe posts 6½ ft. above ground, and set in cement 4 ft. deep and 18 ft. apart, and can water from 2 to 3 acres at one time.

I have seen several plants where the posts were only 4 ft. high. I consider the posts 6 ft. 6 in. high is a decided advantage in that it enables you to cross-cultivate and level your ground when preparing the land in the spring time.

The spray nozzles are generally inserted 4 ft. apart and in a straight line. Each line of pipe is controlled by a union with a strainer to stop all sediment from choking the nozzles. There is also a lever at each line end fastened to the union by which the spray can be turned to either side at will, and to any elevation.

The great advantage and value of a controlled irrigation is evident in planting time, when the ruinous effects of a hot sun or wind can be overcome by turning a refreshing shower on recently set out plants, that might otherwise be ruined, and thus a great deal of replanting is avoided, and labour and time saved. Another advantage is that growth checks may be largely overcome by judicious spraying at times, and thus a finer crop of vegetables produced. Besides vegetables that do best in a cool moist rootage can be given to a greater degree the conditions they require by having controlled overhead irrigation.

Another feature, and one from which I benefited this last season when the early frosts set in, was by spraying early in the morning. It seemed to draw the frost out with less injury to the plant, but my experience along this line has been limited.

I also benefited very materially in growing a crop of 10,000 plants of cauliflower. At the time of transplanting, the July drought had already set in, and not one plant would have survived had it not been for irrigation, and I may be pardoned in feeling a pride when complimented by my customers on the cauliflower I grew solely from having overhead irrigation.

It has been questioned by a great many as to whether spraying is equally valuable on clay, and the more porous soils; my own land is a clay soil, and some of it rather heavy. There are features in a clay soil when spraying is invaluable

after a very heavy shower of rain. It is well known to those having a clay soil that if the soil is not loosened by cultivation it bakes and hardens. It is almost impossible to work it properly, and should you not be able to do so just at the proper time, your crop is seriously injured, if not altogether destroyed, but by judicious spraying for a short time you can restore the soil to its proper condition for working, and thus save the crop.

My observation has led me further, and I am sure of wonderful results. I am at the present time constructing a cemented pit to catch the seepage from the manure heap, which is also on a cemented floor considerably above the pit. The floor is built with a gradual slope, and is connected to pit with a strainer and valve. The pit is directly under suction line of irrigation pump. The quantity of liquid taken from the pit can be regulated by a valve as it is applied to the growing crops, and in this way the plant food may be applied just at a time when it is most needed, and the nitrate loss of the manure reduced to a minimum.

Cabbage on Mr. J. J. Davis' Farm, showing the benefits of the Skinner System in an unfavorable season.

In the past we have been watering our manure heaps in the field to keep from fire fanging, and the loss through seepage has been great, and the soil beneath the pile of manure is lost for at least two years.

I would in conclusion, emphasize the wisdom of getting the best seed possible, even though high priced, as I am satisfied from my own experience that there is an enormous loss to vegetable growers owing to the poor quality of seed offered by some seedsmen.

I shall be pleased to answer any questions so far as my knowledge permits, and also be glad to receive pointers regarding my future contemplated plans.

THOS. DELWORTH: I had the pleasure some time ago of going over Mr. Mulligan's place. If any of you are down at Ottawa it would be well to go out there, and if he treats you as well as he treated me you will not be sorry you went. In regard to these posts that he sets in the ground some 3 or 4 feet in cement, I do not agree with Mr. Mulligan in regard to that style of construction. We set those pipes in the ground, just driving them in. The danger is that in driving around with the team you are liable to drive up against and injure them, and, if they are set in cement, it will not prevent breaking them. I suppose I replace

two or three posts in the summer, and it takes but a very short time, whereas if you have a hole four or five feet deep and set in cement it will take a team of horses and the best part of a day to pull it out, and you are much more liable, if it is set in cement, to break it than if they are merely driven in the ground. Then he has his 6 or 7 feet above the ground. There is only one advantage that I see in having the pipes so high above the ground. You can drive under them and work your land in that way. Now most of us adopt one way of making rows in our fields or gardens. I put those posts only 4 feet high, and apart from the advantage of being able to drive under them all the advantages tend the other way, if you have your irrigation lines not more than 4 or 5 feet above the ground. We get 1-inch pipe second hand for about $20 a ton, and cut in 6-foot lengths and drive in about 1 or 2 feet. Further, if you have it up 6 or 7 feet the weight of the pipe laying upright in a wind such as we are having to-day causes a leverage very much greater, and it is much more liable to get out of alignment where you have the pipe as high as that. We have experimented with several heights. We have tried it at 7 feet, 6 feet, and now I have lowered them to 4 feet. They are very much easier, because in spite of all the strainers that I get, once in a while we get a clogged nozzle, and it is very much easier to clean them when they are only 4 feet above the ground. But in lowering the pipes remember one point. You want to have them so high that you will not injure them by driving against them. I once saw an outfit with 2 feet above the ground—have them up not less than 4 feet. If you have them too low and the nozzle lines are not more than 2 feet above the ground, in driving close to them the whiffletrees will break off the nozzles.

Now with regard to what you can do with irrigation. I do not want to go over the same ground as I did last year, but with every year's experience with it we learn something new. The Skinner Irrigation properly constructed with proper source of supply will supply moisture, but it will not regulate temperature, and a great deal of our trouble this year, outside of the lack of moisture, was from the temperature. Take the soft rot in cauliflower. It is a problem that I want further experience with, to say just how far it is safe to supply all the moisture that you think a crop of cauliflower needs when you have the thermometer standing from 90 to 100 every day. You have the conditions there for soft rot when you supply the moisture. The problem is to know how much water to supply. But it is not every year that we have such heat as we had this year. There are some crops that seem as though they can do with an unlimited supply of water. Take cabbage this year. I just finished a crop of fall cabbage, and we know what kind of weather we had around Toronto through August and September. We started on one side of our patch. We had a patch of cauliflower and after planting the cauliflower we finished up with cabbage. We had the irrigation on our cauliflower and in turning it one way we covered a few rows of cabbage. We had never thought of using it on the cabbage, but I noticed that these three or four rows of cabbage were coming along so fast, and I went to work and fixed things so that we got it along on the others. Gradually we shifted it and got it over the whole thing. That crop would have been an utter loss, whereas we made a good thing out of it. As it is, it is all sold and I got the highest price I ever got for cabbage, and as already stated, the crop would have been a total loss without irrigation.

Another thing that I did last year was double cropping. In early potatoes I was fortunate enough this year to get first prize in the Field Crop. That patch of potatoes was dug just as soon as we could get the judge here to attend to his business and get them dug and marketed some time in July, about the 12th or 15th,

and then the ground was prepared and plowed. The ground was planted with celery and we are to-day marketing a crop of celery that was taken off about an acre of ground, about 27,000 plants of celery. Now that combination would have been impossible so far as that piece of land is concerned; I would not have been able to do anything during the dry weather we had through August and September, we would have gotten nothing at all off it if we had not had irrigation. The whole of that second crop of celery is made possible simply by irrigation. I had another patch of celery put in early that was a failure as it was affected with black heart, but I don't think the irrigation had anything to do with that.

J. J. DAVIS: I had a crop of early celery grown under the Skinner system. I had no black heart.

ADDRESS.

W. B. ROADHOUSE, DEPUTY MINISTER OF AGRICULTURE, TORONTO.

In the first place I thank this Association on behalf of the Department of Agriculture for their very kind courtesy in postponing this gathering on account of the funeral of the late Minister of our Department. I quite appreciate the fact that that action was not without a certain degree of inconvenience to many, and while the circumstances were lamentable, we feel that by that action you have shown your sympathy in a very graceful manner, and the Department, which has suffered the loss of its official head, the members of the Department who have suffered the loss of a friend, the members of this Association and other associations who have lost a friend, both officially and in a very large number of cases personally, all of us appreciate this expression of sympathy and will remember your kindliness in that regard. While, however, my first word is, therefore, necessarily one of reference to the departed Minister, I realize that those of us who are left behind have to wrestle with the problems of the living. We must bend our energies even more than ever before in solving the problems from day to day as we go along that we may individually be more successful and as a country be more prosperous and more of a factor in the crisis through which we are passing. As one listens to the wind whistling about the building at the present time, we are perhaps inclined to forget some of the acute problems which you men had to face not very many months ago, in the excessive period of drought and heat which was the common experience of those engaged in all kinds of agriculture in the Province this year. It is not very long ago, and yet it is so long that many people when they are confronted with higher prices for the products which it is necessary to consume, think that these large prices are merely going into the pockets of the men who are the producers. If they had had to contend with the difficulties which you had to contend with, and which you overcame to the extent of your success, they would realize that there is not in any case one dollar too much going into the pockets of the men whose labor and intelligence combined to produce the products of the soil in the very dry season through which we have passed. These things, however, quickly pass from the memory, and it is necessary to remind the people at large of the fact that we cannot be confronted with these conditions and suffer such a depleted production without, at the same time, requiring a larger return per unit, per bushel, or per pound, as the case may be, of that which has been produced. Those who are at all in touch with the problem cannot help but realize that the producer is the one who of all men

is not being overpaid, and it is a simple matter of arithmetic that even although potatoes are twice the usual price, it is not of any avail if you have one-third only of the usual crop. This is just an illustration of one branch of the industry of agriculture, and I am sure it is equally true in many other lines. These conditions, however, have to be met, and having come through the trials of the past year we are now looking forward to the season which lies ahead, in the hope and confidence that we will be favored by Providence with more favorable conditions than those which have existed during the past season. In so doing, however, we can not overlook the fact that there will be some conditions still present, and possibly the most prominent one will be the shortage of labor resulting from the counter-demands made at the present time in the prosecution of the war. The problem is often asked: "How are we to keep up our production if the men are to be taken away from the avenues of production." That is a problem which it is not easy to answer. There is, however, one way and one way only in which to a degree, at least, something may be accomplished, and that is by utilizing the very best methods known to science, known to those who have put these methods of science to practical application, and thereby perhaps realize higher and larger returns. You do well, therefore, in coming together in this conference to study these methods; and from this conference I am sure it will go out in the various ways of your organization, through all its local branches, the diffusion of the information, which will be most helpful in enabling men who are laboring under the handicaps of the shortage of help, if not mayhap also of adverse weather conditions, to make the very best possible returns which can be made under these circumstances. It goes without saying—in fact, it is hardly necessary to repeat what is so often said—that the duty of all at the present time is to lend every effort, put forward every ounce of strength in adding to our production, or in contributing in any other way possible to the strength of our country at this particularly trying time, and I am sure that at this conference and through this conference, as well as through the local conferences which will be held through the coming winter, you will make a very substantial contribution in that regard. I need hardly add that the Department, as in the past, will be prepared to stand back of you, to work with you, and through you, in the accomplishment of the objects which we have mutually at heart, of mutual benefit, and of benefit to the Province as a whole.

J. J. Davis: There are two methods of putting up pipes, the one mentioned by Mr. Mulligan and the other by Mr. Delworth. I use both and am not satisfied with either, and I saw at Mr. Cooke's place at Cataraqui another system. I do not know whether it is better; that is for him to say. There is a large post put up at each end and a wire suspended across. The great advantage is that you can work all around underneath. The trouble with the system that the rest of us are using is that you have a row all along where the pipes are that you cannot plow. You cannot manure unless you drive along with a wagon and throw it in. With their method they can run the manure spreader in and cultivate it just the same as though there was no Skinner system occupying the land. Unless there is a great disadvantage through swinging in the wind or something of that kind I think it is the best method.

T. M. Mulligan: The post I use is 1¼-inch pipe. I have never succeeded yet in drawing it off; the pipe is too strong. I am able to plow right up against the post by plowing with one horse and shifting the clevis on my plow, which sets the plow in another 12 inches. I have been able to plow against each post without wasting any ground. As far as the short post is concerned it is impossible for me to

level the ground without cross cultivation as you leave open a furrow between every line.

WM. COOKE: The posts are all right, but the wire is handier; at least we find it so. Ours is about 70 yards long, and we have one post at the centre and one at each end. You have less trouble when cultivating.

A MEMBER: Do you find that in the wind the wire swings much?

W. COOKE: It works all right. In the centre that wire will sag. We shorten it and bring it up level then we fasten it to the centre post. We have had no trouble so far, but, of course, we have only had it two years.

A MEMBER: What kind of posts do you use?

W. COOKE: Old telegraph posts, the wire is 10 feet high, this allows for some sag in the centre, but still the team can go under.

Some types of onions.

A MEMBER: What kind of wire do you use?

W. COOKE: No. 7.

F. F. REEVES: Have you any trouble with the nozzles clogging?

W. COOKE: No, we can reach our wires with a hammer to clean the nozzles.

J. J. DAVIS: I thought that method was so superior to the other that I got some old telephone posts that had been cut off above the ground. Some of them are 20 feet long and a good size, I bought a few to put up just to see if it would work out a little better, I did not know what size wire to get for the top, but concluded that No. 7 would do. I told my son to bring some, but as he could not get that size, he brought No. 6.

THOS. DELWORTH: By the time you have had those big posts for a year or two you will get back to the ordinary posts again. I went over C. W. Skinner's place in New Jersey. His cables had sagged so that the pipe was bending down, and as that means loose joints in a short time his foreman showed us a turnbuckle arrange-

ment for tightening that. Now the main thing that you gain by having it suspended on a cable with two or three posts is that you are able to plow all the ground. If you have these posts set in a line it does not make a bit of difference whether they are 15 feet or 150 feet apart. Those posts, with us, are put in 16 feet apart. When we open the ground at the post we do it with one horse. When we close it we do it with one horse. When you are opening with a one-horse plow you can do it and leave a strip not more than 4 inches wide. That strip we work with a fork and it does not take very many minutes to do. We are not using a manure spreader yet, because there is no spreader on the market that puts it on as thick as we require. We turn the ground back and do not need to do any digging. You spoke about the waste. We always put a row of whatever crop we are growing under the pipe between the posts. You can work up as close with the scuffler as to any other row you have in the field. And there is no more work in growing it except when you are opening your ground, we dig that piece with a fork. I cannot see where the saving is in that cable except where you are going to cross work your ground. For the last two years, or since we have been using irrigation, we have used a certain harrow and it levels and loosens as well. There are 45 or 50 small disks with a levelling board combined. The big problem that I found was how to use that strip of ground under the nozzle line.

ADDRESS.

I. C. Swart, Toronto.

I was brought up on the farm and feel at home among you. Referring to the discussion on seed potatoes yesterday, while at Beamsville, I met Mr. Robertson, and he said he is going this summer to make an experiment, hire an expert to try and get a good line of seed potatoes. He realizes that they need something down in the fruit district so that they can raise more potatoes than they have in the past. I thought it was very good and certainly endorse it, and told him I would give him any assistance I could.

Regarding seed celery: I was talking to one of your vegetable growers at Sarnia last Saturday and he is going to experiment next year on celery seed. I believe he raises somewhere around 25 to 30 acres per year. The celery seed has been a serious problem with him, and he told me to tell you that next year he would be able to give you some results from our experimental test. We cannot do this until next fall, but he expects to be able to give his experiences in growing celery seed. He is also trying an experiment of meeting the early market on celery by putting some celery in cold storage. He says when celery is a good crop it is a cheap thing, but you will always notice it is a high price in the spring. He has put in ten acres for an experimental test. I thought that was quite interesting to you vegetable growers of Ontario here, because we know that celery in the spring is a very scarce article, and, if we in Ontario can put some of our own goods on the market, we will be able to get a larger price for our goods. Three years ago a young man in the city bought three or four carloads of potatoes at a very cheap price, put them in cold storage, carried them over that year and got a good price for them the following season.

Regarding the fertilizer, fertilization is only in its early stage at the present time. As the Professor was saying here a few minutes ago, it is pretty hard work

to get just the right mixtures in each locality, and we as a company expect to carry on several experimental tests throughout the Province of Ontario. We are going to try using various mixtures to see which will give the best results.

I expect to carry on a test with one of the largest tomato growers in the Vineland district, and we are going to use different mixtures to see which will produce the best and most solid tomato for the market. We want the vegetable growers of Ontario to feel at home, to write us asking any questions and we will be prepared to answer. I don't know just how to term it, or what we are going to do, but we are thinking of giving a prize for the best results. We are going to leave it to your secretary here to make a proposition for the Province of Ontario. Because we know that if fertilizers are to give results it has to be through the grower, and we think if we can get 100 or 150 people interested in trying it out and get their experiences, we will know what the country needs. But we want to get results. Results are what you are after, and I believe you will agree with me that fertilizing is a matter of experience at the present time. Now we find with the American fertilizer companies they have carried on these experiments and they have proved of benefit to the growers, and we want to do something. We would be glad to get in touch with any of you gentlemen in this matter.

J. Lockie Wilson: Mr. Swart has come here to offer substantial prizes for the proposition. The point is how to arrange the matter. It will have to be done either through the Agricultural Department or through the Vegetable Growers' Association. The results will have to be examined, competitors will be required to have their crops, whatever quantity, whatever size of crop you will determine on, they will need to be judged when the Garden Competition is being judged in order to save the expense of the judges going to the same place twice. I do not like to have the responsibility of it all on my own shoulders, but would like to have a few of you associated with it.

DISCUSSION ON IRRIGATION.

O. J. Robb, Vineland Station.

I would like to make a few suggestions and tell you what we are trying to do over there. It is our object to try out the system and find out the exact gain and profit from its use. There is no doubt in my mind that it is a profitable proposition to any vegetable grower or small fruit grower; it is just a question of systems and the availability of water supply.

Regarding the height of pipes holding the overhead pipes we have permanent fixtures somewhat over 6 feet high set in cement, and we follow Mr. Delworth's plan of planting a row underneath the pipe and cultivate as closely as possible, and we have had no trouble in working the land, we have careful teamsters who are used to working around fruit trees and they scarcely ever touch the pipe. We have had considerable trouble with the nozzles clogging, in fact, sometimes the whole pipe would be stopped up. This was due to the water in the lake being dirty at the time we were pumping, when there is a high wind and our intake pipe is not out far enough to get clean water. We have found that it costs approximately $3.60 to irrigate an acre for ten hours, putting on 1 inch of water. We have a large pump and can handle an acre and a half at once. Our whole system consists of a little

more than three acres with adjoining check plots. This past season we have had favorable results on practically every crop excepting some early beets and our strawberries. The early season was so wet that we did not do any irrigating, and consequently there was no gain from it. We have an eight-horse gasoline engine for pumping. The whole system has been in use the third season now and our average results are favorable on the whole, and while we are not prepared to give any real definite figures yet, owing to the variability of the different seasons, as it takes a number of seasons to get at hard, downright facts, we have raspberries, strawberries, asparagus and all the other vegetables throughout the season under the system. This season we have saved on our raspberry crop almost one-third its normal yield. In other words, we increased our yield almost three times in two of our varieties, or over twice the amount on the unirrigated. We also had great success in starting a second crop of beets and carrots and red cabbage and cauliflower.

J. J. DAVIS: What success did you have with strawberries?

O. J. ROBB: It was practically even this year. I did not irrigate them, but last year we had a net profit of something like $60 an acre.

J. J. DAVIS: It has been my experience that strawberries were the least responsive of anything to irrigation.

O. J. ROBB: In my own opinion I would not install an irrigation system for berries unless I was in a very dry district. I would depend more on cultivation. Irrigation is not the only factor for increasing such a crop as that, as they and other vegetable crops want good soil. Water is simply one of the factors. I find from the irrigation results I have had some very interesting experiments by the use of nitrate of soda, in the case of beets and carrots and also to a slight extent on celery. I apply it at the rate of about 800 pounds an acre, put on in about five different applications of a week or ten days apart. I had one instance at least where the benefits were greater than water. It had a greater effect than irrigation, that together with irrigation made a further increase, but not to such an extent as the nitrate alone.

F. F. REEVES: That is a very heavy application. Would the results more than compensate for the expense in applying 800 pounds to the acre?

That would run this year over $60 an acre for nitrate of soda.

O. J. ROBB: I think it would pay.

THOS. DELWORTH: What is the pressure of your pump.

O. J. ROBB: We have a gauge on our pump and it ranges between 30 and 40 pounds.

GREENHOUSE TOMATO GROWING.

J. D. NAIRN, HAMILTON.

I have six King houses, they are 112 feet long and 25 feet wide, and a lean-to house where I grow the plants. Then I have a 40-foot house (Lord and Burnham) 125 feet long. I also have a Lord and Burnham house 75 feet wide and 191 feet long. And the whole plant is heated by steam.

For the winter crop I grow lettuce. One year I grew tomatoes in the winter time but owing to this new blight I have discontinued to grow them in the winter time, and in the spring I grow tomatoes, about 10,500 plants. I sow the seed

about the 1st of January. Last year I had trouble getting the seed and it was sown about the middle of February. The variety I grew last year was Carter's Sunrise. I also grew about 500 of Bonny Best; when the Bonny Best, about four years ago, were at their best, I had a perfect crop of them, but lately somehow or other the seed seems to have gone back and that is why I have discontinued them. The first two trusses seem to set alright, but the others do not fill out properly, while with Carter's Sunrise, the tomato is not so large, it seems to bring more per average plant. Some of the growers don't like them, but I grow them all on the ground, not on benches. And they seem to produce a little larger size by growing on the ground than they do by growing on the benches. I have two benches where I grow the plants and I grow tomatoes on the benches after the plants are taken off, but I never can get the size on the benches that I do on the ground. Some

Curing onions for shipping. Photo by J. J. Campbell.

people say that one can average five, six or seven pounds to a plant, but I am perfectly satisfied with an average of four. Out of 10,500 plants you might run across some that run up very high in weight, but the 400 or 500 blighted ones in a season cut the average down to four pounds a plant. Some plants will yield more, other plants not so many, but the average is about four pounds.

Now as far as growing plants is concerned you all know that help will be very scarce. Last year I was late getting started with them and the season seemed to be open and just in my line, therefore, I got a crop off in good shape. In other years I generally plant them all in 4-inch pots, but this year I was short of help and rushed, and I dug them out of the flats and planted them in after the lettuce was off, and they seemed to go right along when the bright weather was on and never stopped. I saw no signs of blight until about the middle of June. I waited for the seed to come across from England rather than plant a cheaper variety of tomatoes and paid about $24 a pound for the seed. I have enough seed for two years yet. So far as tomato seed is concerned, if any grower can get a pound of

seed guaranteed to be free from blight it would be worth $1,000. This blight does not seem to be in the soil or in the seed, it seems to me as though it was in the air. Perhaps not all of the growers are familiar with it. It attacks the top of the plant, and it will run right down and blacken the plant and disfigure the tomatoes. If you can catch it quick enough and cut it off within one or two bunches of the bottom you might be able to get a couple of pounds of tomatoes off the vine. In a large space if out of 10,000 plants you lose 400 or 500 you hardly miss them, but in smaller areas it hits pretty hard.

I started to put the tomatoes on the market about the 1st of June last year, the price was $3.25 for a basket of 15 lbs. and held there until the 1st of August; after that the price dropped. It never dropped below $2.50 until I had the crop off. The first fair picking of Carter's Sunrise I had 70 baskets. I graded them closely and I only had one basket of seconds out of 70. The highest picking I had was 225 baskets on the 7th of July, I think out of 225 baskets I had about 12 baskets of seconds. There were no culls, the seconds were just the smaller ones.

As far as the blight is concerned for two years the Guelph College people have been working on it. I sent up plants and diseased tomatoes and soil. I think they developed it once themselves, but I am not sure. I have not heard anything of it lately. If tomatoes are grown for the winter time it should be watched for a little more closely. I do not know how to check it. The only way I have is to see that the tomatoes are planted and taken care of right from the start, and kept growing, not stunted. Never water overhead with the Skinner system. Water underneath. After the fruit commences to set I cover the ground with a strawy mulch, which, when you water with a hose prevents the soil from splashing and helps to keep the plants moist, and, therefore, you only need to water about once a week. I stake with iron stakes. I drive them into the ground until they are solid. I never trim them before the first fruit sets and I tie with raffia. I get it from the seed store and throw it in a tank of water which softens it up, and if you tie with this it never cuts the stalks. When I get from 5 to 8 trusses of fruit on a plant I stop it. By planting in rotation like that I have a continual supply of tomatoes until the outside ones come in. The Bonny Best tomato seems to set good for me for a couple of trusses on the bottom then it stops. You might get some more on the top. I think that tomato was a good kind, but since there arose such a demand for it they seem to have got the seed all mixed up.

PROF. CROW: What is the temperature in your house?

J. D. NAIRN: I start to plant them in the houses anywhere from the 1st of March. I have planted them as late as the first of May. The temperature in March never goes below 60, the minimum is between 60 and 70. The highest temperature I get is 110 in the summer time. I figure on putting the tomatoes on the market about the 1st of June when the demand is on. Now they ask for tomatoes in the winter time, but at the price you would have to ask for them they might buy one basket per week and the demand does not seem to be there. In the spring crop just before the outside ones are on is when the demand seems to be heaviest. If I had a house heated with hot water and raised benches with sub-irrigation, I would not be afraid to grow them for the winter time.

PROF. CROW: What kind of soil have you got?

J. D. NAIRN: It is a sandy soil.

PROF. CROW: Does it get fairly solid?

J. D. NAIRN: If you walk on it. Do you think that the blight originally came from Michigan seed?

PROF. CROW: I don't remember.

J. D. NAIRN: Where I first got the seed was from a seed store at Hamilton. I asked them where the seed was grown and they would not tell me. I wrote Prof. Howitt about it and he wrote them again, and they told him it was grown in Michigan, and he traced it up and found the blight was very bad down there. I do not know how it can be in the seed because I had the seed direct from England and it has developed just the same.

PROF. CROW: Do you think the tomato plant stands 110 degrees of temperature?

J. D. NAIRN: Yes. When the crop is ripening.

PROF. CROW: Do you think a young plant 2 or 3 feet high will stand it?

J. D. NAIRN: It will not.

F. F. REEVES: What fertilizer do you use?

J. D. NAIRN: Bonemeal. I used it more on account of the lettuce. Then I use the vegetable fertilizer same as on celery.

PROF. CROW: Where did you get the seed?

J. D. NAIRN: In Hamilton. Stokes claim they have a special strain of Bonny Best. I have grown the Industry, Stirling Castle, The Duke of York, and several other varieties, but the only one I could find that was up to date for the greenhouse business was Carter's Sunrise.

PROF. CROW: Is there any difference in those varieties with regard to disease?

J. D. NAIRN: The Industry did not show it until late in the season, then it seemed to take it harder than any of them. I grew a tomato called the Comet and only got one or two on a truss. It seemed to be an awfully hard tomato, but for money making seemed a poor variety.

THOS. DELWORTH: Did you ever try fertilizing with phosphoric acid?

J. D. NAIRN: No.

PROF. CROW: When does the blight first show up in the season?

J. D. NAIRN: About the first week in June, but in the winter crop that I grew two years ago when Prof. Howitt and Dr. Stone were down, it started in September. That was on the Bonny Best, and it seemed to attack the weakest plants first. I do not know whether that would have anything to do with a fall crop of tomatoes grown outside, whether they would be grown in a frame in a hot wind, and they might get a check in some way, then when they are put inside they do not seem to grow and the plant might be stunted. That is why I think if you have your ground in shape and can plant them out of the flats, when the plants are growing fast, and they do not get a check is better than potting them and moving them around and taking a chance on getting them dried out.

I was greatly troubled with the white fly three years ago, while last year it was not noticeable at all: but you should get rid of them at the start. Use ¼-ounce cyanide potassium, ½-ounce sulphuric acid and 1 ounce of water to a thousand cubic feet air space. I put 2 ounces cyanide, 4 ounces acid and 8 ounces water to a jar, and use six of them in a house 75 x 191.

A MEMBER: Do you find the blight alike in the small and large house?

J. D. NAIRN: In the big house the blight seemed to show up worse than ever until last year when the blight was worse in the smaller house. It seemed to attack the plants right along the path first.

A MEMBER: If the weather had been dull for a week or so and then came out very bright would that be the time the blight would affect them?

J. D. NAIRN: In the spring of last year I ran the boilers on until about the 15th of June and never watered unless the sun was out. One thing that tomatoes do not like on their leaves is moisture.

A MEMBER: Is it not dangerous to stay in the house after you put in the chemicals to destroy the fly?

J. D. NAIRN: I put water in the jars first, carry them around in the house then put in the acid and drop in the cyanide last when ready to go out.

A. McMEANS: Do you find any difference mixing up your acid in the water some hours before using it?

J. D. NAIRN: I never did that. I think it is better to go carefully with that acid and use it oftener, than to use it heavily, because if you have a lot of blossoms on, it will affect them.

A MEMBER: Should it be used on dark nights?

J. D. NAIRN: It can be used any time after dark. I had a slight touch of mildew in one of the houses last year, the first time we had it.

J. J. DAVIS: We had it last summer. It is a disease we do not mind if it does not come too early, but if it comes early it stunts the crop.

J. D. NAIRN: I think to overcome that, you should fire a little longer and give plenty of air.

J. J. DAVIS: After it starts the spot shows right through the leaf. First it shows on the top side of the leaf, then it keeps increasing until the whole plant goes.

J. D. NAIRN: I have never seen that condition. I have seen the mildew act like that but I never saw red spots. I have seen the leaves dry up. They, of course, do that more or less later on in the season when the crop is nearly done.

J. J. DAVIS: If this comes on before the trusses are set, the tomatoes on the top trusses are lost to you.

J. D. NAIRN: It may appear to be a waste of money to run your boilers up to the 15th of June, but so far as spending $200 for that much more coal and labor, if a person can save that in a day or two, it is a good practice.

J. J. DAVIS: Have you ever used liquid nicotine on lettuce?

J. D. NAIRN: I use nicofume, that is a little more expensive than the nicotine, but it is much stronger and gives good results.

J. J. DAVIS: How do you use it?

J. D. NAIRN: We put a tablespoonful to a water can or pail, then use a little spray pump. If the lettuce is not too large, the best policy would be to use the cyanide. Be sure the lettuce is perfectly dry. Start with a little, and then increase it.

J. J. DAVIS: Ever since I have had a greenhouse I have always secured all the tobacco stems for nothing; this year they wanted $12 a ton for them. There is considerable water in them.

J. D. NAIRN: Are they allowed to sell them?

A MEMBER: They are doing it.

J. D. NAIRN: In Hamilton there is a tobacco store, and we can get the stems whenever we want them. The ones you see advertised generally contain some kind of chemical. I would rather pay a little more money and get them direct from the tobacco stores. When growing lettuce, if the house is kept well ventilated and sweet, the green fly does not breed so readily.

J. J. DAVIS: I always thought the opposite.

J. LOCKIE WILSON: The method of shipping tomatoes to the exhibitions in the boxes we sent out with a layer of corrugated paper, or even a layer of ordinary heavy paper between the layers is proving very successful. Tomatoes which arrived at Ottawa in the very best shape were shipped by Thos. Delworth, the variety being Carter's Sunrise. They were not a large tomato, being rather

undersized but they were just exactly like the variety that is sold altogether on the market at Covent Garden, London, and I never saw tomatoes in better shape than those arrived in at Ottawa, after travelling by express, and some of the boxes had some of this excelsior packing around, helping a good deal, too. Shipping them in those boxes, two tiers well packed, is quite a success. When they go in baskets they get badly damaged.

THOS. DELWORTH: If you want a fancy price for tomatoes, try a few Sunrise on stakes this year. They produce very heavy crops, but take a lot of work, and they have to be sold in competition with the ordinary outside tomato. I sold a lot of them to one of the largest departmental stores. They bought them by the basket, I got about double the market price, and they were resold by them as hothouse tomatoes.

F. F. REEVES: We found we could get anywhere from one and a half to twice as much once we got the people to try them, but this was hard to do. Once we got them started we had no difficulty in selling them, and the people we sold them to wanted to know if we were going to grow the same variety next year. You do not get as heavy a crop but you get one that you have no difficulty in marketing, a good shipper and one of the best flavors.

J. D. NAIRN: Seedsmen have two tomatoes, the inside and outside. If the Association would go to them and explain to them about the tomato being up to the standard for the hot house growing and that you were willing to pay a good deal of money for the seed they would make an effort to pay better attention to it and keep the standard up and not let it run down like Bonny Best did.

GROWING ONIONS FOR PROFIT.

JNO CAMPBELL, LEAMINGTON.

The soil that I am familiar with is a muck or swamp soil ranging from a depth of 10 inches to 17 feet, with a clay subsoil, rich in nitrogen, but deficient in potash and phosphate. To balance the soil with plant food, I use one ton per acre of phosphate rock, costing $9 per ton, laid down at our siding nearest our farm, about five miles. This rock shows analysis of 14 per cent. phosphate and ground to a fineness that 95 per cent. will pass through a 10,000 mesh screen to the inch. I apply this one ton per acre once in three years and until war was declared, I used 250 to 300 pounds per acre of muriate or sulphate of potash. Now I am using about five tons of limestone screenings purchased at Vinemount, Ontario, at 35c. per ton. Fine ground limestone can be purchased in Ohio at 65c. to $1 per ton. Similar can be purchased in Ontario at $2.30 per ton at loading stations. About two tons per acre should be used once in every five years. To the one purchasing the price will depend on your nearest point to the supply. On application to the Department of Agriculture, Washington, the name and address of the different phosphate and lime dealers will be given. Enclose 10c. for each bulletin required.

DRAINAGE.—To get the best results I find it necessary to tile drain the land. While open drains may be used, the loss from idle land and the cost of cutting the weeds, more than double the expense of laying tile. Furthermore, I find that drain tile are being used for sub-irrigation in different States of the Union. I

have personally examined those used in Ohio and Florida and have followed out the same plan on my farm and have fifty acres under sub-irrigation, which system more than paid all expenses for installation this season. My experience is so limited I will say nothing more on irrigation.

Fitting the Land.—Deep fall plowing, harrowing, levelling, rolling the land firm, then a stroke with the harrows to leave the land slightly rigid, completes the fall operation. Spring fitting consists of galing, harrowing and smoothing, followed with harrowing and rolling. The seed bed is now ready for the drill.

Planting.—After many years of experience with drills, we have discarded all but the Iron King. This drill has exclusive features, being easy to operate, having a positive force feed, and seed is deposited in a narrow row. This feature is worth much more than the cost of the drill. The drill is manufactured in Madison, Ohio, by C. W. Genung and usually retails at about $10.

Sowing onion seed on Mr. Campbell's farm, Leamington.

Wheel hoeing starts the same day as the drilling, as we usually plant about April 7th to 15th, depending on the season. We use the Iron Age single wheel hoe and find it has the advantage of close control to the shank of the hoe; with a large wheel and control, with such an advantage, the hoe can be wheeled or forced to the desired place with very little effort. These special advantages are not found in other wheel hoes. The advantage of wheel hoeing at planting time is that the operator finds it easy to trace the depression left by the drill. By placing the shanks of the knives together and slightly bending the blades down, the operator merely disturbs the packed soil above the seed and stirs to a depth of about one inch on both sides of the newly planted row, which depth is usually one-half to three-quarters of an inch, depending upon the weight and density of the soil. One must keep in mind the danger of a wheel hoe in the hands of an inexperienced hoeman, where you are hoeing so close to the seed.

The second wheel hoeing starts once the onions show the double, or the hoeman can distinguish the row. Usually for this wheel hoeing the shanks are placed about two inches apart with pieces of tin about the size of your open

hand and somewhat the same shape. The pieces of tin are fastened to the shank, being somewhat the shape of a mouldboard of a plow, having a tendency to shove the earth from the young plants.

The next or third wheel hoeing, the blades are changed, the shanks are placed to the outside of the frame with the blades inside. The operator walks between the rows keeping close watch at one side of the row, finishing the alternate rows at each wheel hoeing. Thus about once a week the crops should be gone over until weeding time. If this method has been followed out and wheel hoeing well done, the cost of weeding will be at a minimum. A great deal depends on how free the land is of weeds and the weeds you have to deal with.

Weeding.—This is considered the greatest burden onion growers have. I must confess no grower can look lightly at this problem. My system is to use boys, whom I consider the cheapest labor I can get. I provide a sleeping room for the boys and board them and pay by the day, by the row. Each row is numbered; each boy has a book and pencil, the date of weeding is kept and the boy that did the weeding. A bonus is given to all who stick through the first, second, third and fourth weeding. Sometimes I have had to weed five times, but usually four are sufficient. The advantage I find in paying by the day, by the row, I pay according to the services I get. No work, no pay. The basis of a fair day's work is figured at $1 and board. Some earn 50c.; some with a bonus get as high as $1.25 per day. There are fines for leaving weeds in the row, fines for pulling the onions, and a bonus for careful and clean weeding. After weeding time or about the last weeding, the tops begin to interlap. I use a galvanized hood over the wheel hoe, laid over the wheel and about three and a half to four feet long attached to the frame, dipping to the front to about three inches and turning it so as not to root or dig in the earth. If the ground is uneven, this hood will adjust itself and shove the leaves to either side. This wheel hoeing the last time can be done almost as cheap as at any time previous. For this last one or two wheel hoeings, the shanks of the hoes are put together. Only about one or one and a half inches of the blades are turned up and dulled so as not to injure the bulbs and this has also a tendency to throw a little earth towards the plant, covering and destroying any small weeds that may show late in the season.

Selection of Seed.—I cannot emphasize too much the necessity of getting good seed. One grower in our section lost from planting poor seed this season easily $15,000. Not always the highest price seed is the best but it pays to buy the best seed. Get in touch with a good responsible firm and stick to them.

Requirements of Market.—Most of our markets ask for Globes, usually Globe Danvers or Southport Red or Yellow Globes. We seldom have any call for white onions. We sow about four to five pounds of seed per acre in rows fifteen inches apart. Get the rows even and straight and if you cannot plant straight, get someone that can. It will save you in wheel hoeing many times the cost of planting, which usually costs about $1 per acre.

Harvesting.—When about two-thirds of the tops have fallen over, we start pulling, each taking two rows and placing the four rows in one, the bulbs together, or by placing the bulbs down first and tops up so that the bulbs are not exposed to the sun. I prefer the latter method to protect from sunburn, which greatly injures the appearance and keeping quality of the onions. The onions are left in the field usually about a week or ten days, then gathered into crates and stacked up four high. This does not stop the process of curing, but protects

the bulbs from the rain and sun. These crates are hauled to the topper, which is mechanical. The capacity is 2,000 bushels per day. The onions are taken direct from the topper to the crates which we pile usually about ten high in the curing house with air space on either side. For immediate use about ten days is considered sufficient time to cure. If any sprouts are going to show, usually they appear in that time. From the crates the bulbs are put over a screen slatted one and a quarter inches apart. Any loose leaves, small onions sprouted or inferior stock is taken out. It usually requires eleven helpers to operate this screen to full capacity. If the onions are a good quality, with this amount of help, one will put up 100 bags per hour. The onions are then ready for market. It must be kept in mind that the capacity of the screen depends upon the activity of the helpers and the quality of the onions. I would just like to emphasize the necessity of clean, honest packing and herein give a few extracts of what our buyers say to our past methods.

Hand cultivation and weeding of onions.

St. John: Onions improperly cured and not fit for market. If the onions were put up in clean and good pack, we could easily handle Canadian onions.

Riviere Du Loup: I am sorry to say that as a whole I have had less trouble with American onions than Canadian. The American onions are more uniform, of better color and better keeping quality. I lost nearly three-quarters of the Canadian stock I purchased last season. From a patriotic point of view I would rather purchase in Canada if the stock was as good as American, but when will that be? If it does come, I will look no farther than Canadian stock.

Moncton, New Brunswick: We always give Canadian onions the preference, but find the stock generally runs smaller than what we can import.

St. John: Canadian packers of onions are improving, but at the same price would much prefer American.

Quebec: Sixty per cent. of the onions I use are American. We find American onions superior to Canadian in quality, pack, size and color. Canadian growers must wake up.

Moncton: The quality of Canadian onions is poor and damp. Our customers do not want them.

St. John: Comparing American with Canadian stock, I find American uniform in size, cleaner and better color.

St. John: Our experience with Canadian onions is generally that they are not delivered in as clean, dry shape as the stock we purchase in Massachusetts, and often Canadian onions are improperly cured.

St. John: I purchase about twenty-five cars annually and find as a rule American onions much better color and keeping quality.

Quebec: Canadian onions seem damp and do not keep as good as American.

Montreal: We handled about 125 cars last season. Three cars of Canadian stock. We give American a preference. We like the Globes better than the Flat Weatherfield. American are more uniform.

Halifax: In this market American onions are looked upon as better than Canadian. Better keepers and more uniform.

Owen Sound: It is very hard for us to get Canadian onions in first class dry condition. We often wonder how it was we could get such nice onions from United States markets at this time of the year. American onions are hard, firm and dry and any Canadian onions we held over to this time, March 25th, are usually soft and not of much value.

Halifax: American onions are always dry and uniform.

North Bay: American packers put up uniform clean pack. Canadian stock is small, not matured and not uniform.

St. John: We much prefer American onions. They are even and better quality, better cured, cleaner, tops cut shorter. Our customers prefer them to Canadian onions.

Halifax: We do not push the sale of Canadian onions. They are not what they should be; soft and not matured. A car arrived a month ago. The shipper was worse than a rogue. He put about 25 bags in the doorway of the car, fairly good stock. The balance of the car was worse than culls. We want quality, clean pack, shipper to stand back of his pack, then we can handle Canadian stock.

I have several other letters I may quote, but think this is sufficient for any Canadian grower to see the necessity of clean pack, of good color and uniformity, to win the Canadian trade. Mr. Johnston and Mr. Reeves will bear me out in these extracts, for they have both gone over them with me. It is easy to find room for these complaints. Visit the onion growers and what do you find? Bagging directly from the machine, no thought of curing. Mr. S. C. Johnston and I opened some of the bags of one grower in our section and found twenty per cent. not topped at all. Go over the fields and you will find that onions, after being pulled, are allowed to remain in the fields for six weeks, sunburned, even frozen, new roots taking hold of the ground, sprouts starting; then you will not wonder at the complaints that we hear from the trade.

Not all buyers are honest. We have some buyers that are just as dishonest as the growers, who take advantage of every chance they get, who, when they have your goods in their city where they also have their associations, put their hand in your pocket and steal $100 or more by refusing your stock when it arrives, stating that the onions are not sound, etc.

I find only one way to deal with those. Put them on a list. Money must accompany all orders.

LOADING.—Teams usually haul 80 sacks to the load, depending on the state of the roads, 400 sacks being a minimum car. One car is the product of one good

acre of onions. Prices range from 75c. to $1.50 per 75 pound sack. This season, onions sold from $1.75 to $2.50 per bag, about 200 bags being the average yield.

Care should be taken in handling the onions at any stage of the business, not to bruise or damage to any extent if possible. I have found that where onions are bruised, decay ensues. These are a total loss to the buyer.

I am of the opinion that the growers of onions to capture Canadian trade need a standard whereby we may pack our onions, that when we do pack to that standard, our stock will not be refused. Until we get the necessary legislation to standardize, we will remain in the rut and our buyers will go across the line to our American cousins for their supply, which is an annual loss of many thousands of dollars to Canadian growers.

SUCCESSFUL GROWING OF CABBAGE.

Paul Work, Ithaca, N.Y.

I extend to you the good wishes of the New York State Vegetable Growers' Association. While our organization was the first of the State Associations to be formed, we look to your Society as the real pioneer in a work which has already borne fruit and which promises continued and increased usefulness. There are now six such associations in the States to say nothing of the Horticultural Societies which are devoting attention to vegetable crops and problems. May the Ontario Vegetable Growers' Association live long and prosper.

Cabbage.—Perhaps third among the vegetable crops in extent of production stands cabbage, being surpassed only by the potato and tomato. The product is in heavy demand throughout the year. The southern truck crop, the market garden crop and the winter crop from the general farm of the north follow each other in constant succession. The edible portion is the head composed chiefly of leaves. This together with its vigorous growth habit renders it a heavy feeder, especially demanding a liberal nitrogen supply. The plant is hardy as regards temperature and it does not thrive under a hot climate. The southern crop is grown during a cool season.

The Market Garden Crop.—Soil for the earliest crop should be a sandy loam with warm exposure. Southern truckers often prepare the soil in the fall, throwing it up in east and west ridges for protection of early set plants from cold winds, for good drainage and for full advantage of the southern sun. Under present conditions stable manure applied in the fall should offer the main reliance as far as nitrogen is concerned, but supplementary treatments of nitrate are often profitable. Acid phosphate usually yields improved returns.

The profit in early cabbage production depends upon quickness of maturity. The Pennsylvania Experiment Station has shown that there are differences in earliness among strains of the same variety which at ordinary prices would make a difference of, roughly, sixty-five dollars per acre in gross returns. The second great factor lies in growing high grade plants. The most generally approved method for market gardeners calls for seed sowing about February 1st, transplanting to cold frames a month later for further growth and hardening. Flats or plant boxes are desirable because transplanting may be done under cover in any weather, conditions of soil and moisture are more accurately controlled, and later handling is easier.

Except on fall-ridged land, the soil should be thoroughly worked before setting plants in the open, and rows may be marked out from 21 to 36 inches apart according to intensiveness of operations. Thirty inches is a common distance. The smaller sort may be set as close in the row as 15 inches with midsummer sorts as far as 21 inches apart.

Overhead irrigation has proved valuable for early cabbage, but thorough cultivation will usually insure a good return. The drouth danger is not so serious in early summer as later.

The most serious enemy is the maggot fly which lays its eggs on the stem at the surface of the soil. Fall plowing, rotation (the flies do not go far), thorough cleaning up after the crop and good growth conditions all help. Tar paper disks may be had at low cost. These are placed about the stem of the newly set plant and prevent the fly from depositing eggs. Some growers question the practical value of this plan but many have been successful with it. The disk is ineffective if it does not rest on the soil surface or if it is covered with earth in hoeing.

Much hand work is involved in setting early cabbage plants both in frame and field. Efficiency of organization is very necessary and individual workers must learn to work speedily. One cannot afford to pay for three motions where two motions are sufficient.

The Late Crop.—Late cabbage is a most useful money crop for the general farmer. The price per ton does not average high, but year in and year out the profits are satisfactory. The farmer who plants some years and not others usually manages to miss the cream of the market.

Domestic sorts like All Head, Early Glory, and Early Summer are grown for fall markets and for kraut. For storage, Danish Ballhead is by far the leader though various strains differ widely in type and yield. The grower may well produce his own seed, building up a strain to meet his own requirements.

Late cabbage may be grown on a wide variety of moderately heavy soils. The light sands are likely to suffer from drouth and the clays are hard to manage.

Mr. A. E. Wilkinson, Extension Specialist in Vegetable Gardening at Cornell University, has conducted careful demonstration trials which indicate that the crop does well on most soils without addition of potash. Phosphorus is decidedly profitable and 500 to 1,000 pounds per acre of acid goods is recommended. Manure at the rate of ten or fifteen tons per acre in the fall or early spring is a good investment and takes the place of commercial nitrogen unless a bit of nitrate is used to meet a special need.

Cabbage should be planted on the same ground only after the lapse of several years on account of disease, especially club root. The crop follows fall plowed sod very nicely.

Plants for late cabbage are usually grown in the open air seed bed. Four to eight ounces of seed sown on 800 to 1,000 square feet of bed should yield an abundance of plants for an acre. The seed bed should not be over rich and must be absolutely free from club root. Maggot injury in the seed bed is often very serious. A covering of cheesecloth (20 to 30 meshes per inch is effective. See Geneva, N.Y. Bulletin No. 334). Germination under screen is higher, but the growth tends to be soft. For this reason the cover is well removed ten days before field planting. By this time the maggot flies have gone in our climate.

The markets call for heads of only moderate size and spacing is closer than formerly. Three feet is customary between rows; 18 to 24 inches is sufficient in

the row save for large domestic types. Check row planting is to be recommended as the crop makes its growth during a season when drouth is likely to prevail. Hence cross cultivation pays well.

Plants are set by hand, by hand planters of the Masters type and by horse-drawn machines. The latter method is less arduous but the cost is not greatly different from that with other two plans. The hand setter is worth trying and conclusions must not be drawn too hastily. Its use must be learned. It is very economical of water, even in dry weather. Stands are excellent when it is well handled.

Some growers like to sow four or five seeds at a place in the field, thinning a month later to a single plant. A man plants a pound of seed on an acre in a day and thinning takes about the same amount of time. In favor of this plan is

Samples of a good crop.

the saving of plant growing cost, non-disturbance of plant growth when transplanting and possibly the fact that the job fits better with other farm work. On the other hand tillage cost is heavier and plants are more easily cared for in seed bed than field. Some have used this method when plants are scarce and there is prospect of a short crop. Even Copenhagen has been used, planting as late as June 20th.

Irrigation of late cabbage is not ordinarily practicable and persistent cultivation is absolutely essential. Soil should be prepared early and harrowed often till setting time. Slow growth should not discourage the planter, for the crop is occasionally practically made after the 1st of September.

Late cabbage may be sold directly from the field or stored for later market. In comparing field with winter prices allowance must be made for extra labor, cost of storage facilities, shrinkage through evaporation and spoilage together with the market risk. Successful storage requires sound cabbage, low temperature,

ventilation and humidity high enough to prevent evaporation, but not high enough to collect moisture in drops. Insulated houses without refrigeration are widely used and should be located at the station to facilitate loading. Many New York growers cut the heads and lay them in a single layer on the ground in the woods or other well protected place, covering with leaves or straw. This keeps cabbage in exceptionally good condition. Immature heads if pulled root and all and stored in trenches will make material growth during the winter.

Does it pay to grow late cabbage? Some say yes, some no. The cost varies from $40 to $60 per acre, and the higher investment usually brings the better net return. Fifteen tons per acre is good yield for Danish, well above the average, though one grower has failed but once in eight years to harvest twenty tons. Domestic runs about three tons higher than Danish.

The dairy or stock farmer is interested in the roughage from the cabbage field, some valuing it as high as $4 per ton.

Danish probably averages from the field about $6 per ton. Some years only the best can be sold and much is moved at as low at $3 or $4 per ton. Records are broken this year at $30 to $40. Domestic usually sells somewhat lower than Danish. Kraut manufacturers frequently contract year in and year out at $5 —very nice last year, a bit trying this. It is noticeable that the better growers enjoy both higher yields and high prices.

This most profitable and successful convention then closed with all singing heartily the National Anthem.

Vegetable Garden.

THIRTY-SEVENTH ANNUAL REPORT

OF THE

Beekeepers' Association

OF THE

PROVINCE OF ONTARIO

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1917

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Corner Queen and John Streets
TORONTO

To His Honour SIR JOHN STRATHEARN HENDRIE, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to present the Thirty-seventh Annual Report of the Ontario Beekeepers' Association for 1916.

W. H. HEARST,
Minister of Agriculture.

DEPARTMENT OF AGRICULTURE,
TORONTO, 1917.

Ontario Beekeepers' Association

OFFICERS FOR 1917.

President—F. W. KROUSE, Guelph.
1st Vice-President—JAS. ARMSTRONG, Selkirk, Rt. 1.
2nd Vice-President—W. W. WEBSTER, Little Britain.
Secretary-Treasurer—MORLEY PETTIT, O.A.C., Guelph.

Directors—District No. 1, R. E. L. HARKNESS, Iroquois; District No. 2, A. MCTAVISH, Carleton Place; District No. 3, M. B. HOLMES, Athens; District No. 4, J. N. CHISHOLM, Rt. 2, Belleville; District No. 5, W. W. WEBSTER, Little Britain; District No. 6, H. G. SIBBALD, 111 Concord Ave., Toronto; District No. 7, F. W. KROUSE, Guelph; District No. 8, JAS. ARMSTRONG, Selkirk, Rt. 1; District No. 9, JOHN NEWTON, Thamesford; District No. 10, JACOB HABERER, Zurich; District No. 11, C. E. CHRYSLER, Chatham, Rt. 5; District No. 12, R. G. HOUGHTON, Rt. 2, Bradford; Ontario Agricultural College, MORLEY PETTIT, Guelph.

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Revising Committee—MR. SIBBALD, MR. PETTIT.
Honey Crop Committee—MR. COUSE, MR. CRAIG, MR. SIBBALD.
Representatives to Horticultural Exhibition—MR. COUSE, MR. GRAINGER, MR. SIBBALD, and the Secretary.
Transportation Committee—J. D. EVANS, the President and the Secretary.

Representatives to Fair Boards:

Representative for Toronto Exhibition—J. D. EVANS, Islington.
Representative for Ottawa Exhibition—M. B. HOLMES, Athens, and the President.
Representative for London Exhibition—E. T. BAINARD, Lambeth.

TREASURER'S REPORT

FOR THE YEAR ENDING NOVEMBER 30TH, 1916.

RECEIPTS.		EXPENDITURES.	
Balance on hand, 1915	$223 92	Grants to associations	$249 22
Membership fees	934 75	Expenses, Convention	235 53
Queen Order Receipts	882 85	Expenses, O.B.A. Committee..	195 35
Affiliated Societies', dues	146 38	Subscriptions, "The Beekeeper"	807 75
Ontario Government grant ..	700 00	Printing and postage	355 42
Exhibition fixtures	38 20	Queen Order payments	749 28
Sundries	13 84	Office help	138 00
		Office supplies	19 70
	$2,939 94	Incidentals	2 31
		Balance on hand	187 38
			$2,939 94

Audited and found correct,
this 12th day of December, 1916.
D. F. CASHMAN,
Auditor.

F. W. KROUSE.
President.
MORLEY PETTIT.
Secretary-Treasurer.

Ontario Beekeepers' Association

The thirty-seventh annual meeting of the Ontario Beekeepers' Association was held at the Carls-Rite Hotel, Toronto, on the 12th, 13th and 14th December, 1916.

About 200 beekeepers were in attendance from all parts of Ontario.

The President, Mr. F. W. Krouse, occupied the chair.

PRESIDENT'S ADDRESS.

F. W. Krouse, Guelph.

Another year has passed and we are assembled in our Annual Convention, and we thank God for the blessings of the past year, as we think of the misery existing overseas and even in our own country.

The bees wintered last winter as well as they have done for years, and they came out in the spring in splendid condition. On account of the wet backward season in some cases they required feeding before the clover flow began. The past year has been one of the best we have ever experienced. The whole country has enjoyed an excellent crop of choice clover honey. Because of the absence of spring honey, the quality of the clover honey was much better than it otherwise would have been. True we had difficulties in keeping our colonies together as the bees persisted in swarming. It kept us very busy. However, those who stuck to their work and kept their colonies together, were well paid for their work. To those who are new to the beekeeping, I would say that this was not a normal year either in the amount of work nor the amount of honey obtained. The high price of sugar and butter and the scarcity of fruit has created the demand for more honey. People begin to use honey as a daily food. Some use it for butter, and I will venture to state that even when prices become normal again, the demand for honey will continue, and we will never again have the least difficulty in disposing of our crop. Through the existing prices, we beekeepers have had thousands of dollars worth of free advertising. The fact that we have not made advance in our prices has made our honey a food for every one. No one was shut out by high prices. Honey is not now a luxury but a food. People also appreciate the beekeepers keeping to their old prices, when everything else is soaring up.

The only trouble is we are running off the supply. The beekeepers this year had great difficulty in obtaining their containers in time. I know of one man who not having the necessary containers put his honey crop into barrels, lard firkins and almost anything he could get hold of. This of course is not a good way to put up honey. There were many others who had similar troubles. There are only two concerns I know of in Ontario who are making lithographed honey containers. Surely, there are enough beekeepers in Ontario to make it worth while for some other company to purchase the necessary machinery, and let us have our containers on time.

Our membership has decreased by 114. Last year the membership was 1,130, this year it is 1,016. This may be explained by the fact that a number of

beekeepers have enlisted for king and country. Of this year's membership, 419 of the membership came in from affiliated societies, and the balance of 597 by single subscriptions. There have been two new county associations formed during the past year: Nipissing and Renfrew. Five associations: Elgin, Glengarry, Lennox, Addington, and Northumberland, have dropped out, making the number of affiliated societies 24.

The queen order business was continued during the year, and 177 members purchased 1,022 queens at an average of 73 cents each; 243 orders were filled in all. This is less than last year, but considering the great amount of swarming that has taken place, it shows a great desire among beekeepers to improve their stock, as they could have had all the young queens they desired from their own yards.

As before, there was but one exhibitor at the Canadian National Exhibition. It seems too bad that there should be but one exhibitor at this show. I am quite sure that there is a good number of beekeepers that would show if they had the privilege of selling their honey as formerly. I think if no exhibit at all were made for one or two years, the men at the head of the Exhibition would wake up and agree to our proposal.

During the past year death has taken several from our number, Mr. Geo. Ott, of Arkona, died in April. He was the inventor of the Ott hive, of which the Richardson is a copy.

Mr. E. F. Robinson, Victoria, B.C., died in December. He was formerly an Ontario beekeeper. Almost up to the time of his death, he was a provincial inspector.

Mr. Wm. Elliott, Strathroy, died in April. Some of you will remember his address last year on Modern Apairy Equipment and Buildings.

Mr. F. A. Gemmell's name is better known in connection with the Hatch-Gemmell wax-press, and he was assistant inspector with the late Wm. McEvoy.

Mr. W. V. Bowen, Niagara Falls, died in April. He was the son of U. H. Bowen, who also lost his wife about a year ago. Truly our brother beekeeper has had his share of trouble of late.

A son of Chris. Quanbury, of Simcoe, died of wounds received at the front.

We have also lost a friend in the late C. C. James, Commissioner of Agriculture. When he was Deputy Minister of Agriculture, he was a good friend to the beekeepers, giving them all the assistance he could.

The death of the Hon. Mr. James Duff, Minister of Agriculture, was a great loss to our country. He did all in his power for the beekeepers, doing his best for them when they went to him with any proposition to further the interests of beekeeping.

I would say in conclusion, that although we had such a good year, this year prospects are not so bright for next season.

However, beekeepers are of a hopeful turn of mind, and are very optimistic, always looking on the bright side of things, so we must hope for the best.

I greatly appreciate the honor you have bestowed on me in electing me for your President, and with your co-operation I am sure we will have a pleasant and profitable time at our meeting.

James Armstrong, Selkirk: I am pleased with what the President has said about our crop. We have had a good crop all over the Province, and another thing that pleased me very much is that some of the beekeepers who have abundant crop have not raised the price. One gentleman I know has had double the crop that he

ever had in any previous year, and that is certainly good news and something that we all ought to be proud of, I will not detain you further.

W. W. WEBSTER, Little Britain: Regarding the office of 2nd Vice-President being merely a "Farmer Beekeeper," when appointed I did not feel sure that I was quite eligible for the office, thinking it should be in the hands of a specialist. However, this year I had my title changed to Beekeeper farmer." I will tell you how this came about. Previous to this season, farming was my chief occupation and beekeeping a side line. Those at home regarded it as a sort of hobby or pastime, and those working hard on the farm did not suppose a fellow was really and truly working while tending bees. However, this year the honey poured in till we were puzzled to know what to put it in. So this year, instead of being a farmer with beekeeping as a side issue, I developed into a beekeeper with farming as a side issue.

I trust that the occupation of beekeeping will continue to occupy the position it should hold, that is, to keep at least on a parallel with other occupations and professions.

Personally, I like very much the change in date for the convention this year, thus giving all a chance to get the work wound up. It was a happy thought whoever originated the idea. The "Beekeeper," I think gave Leeds and Grenville credit for it, so I would congratulate Leeds and Grenville on having at least good common sense. One year I attended the convention with bees still unpacked, and found that I did not enjoy the convention as I otherwise would have done. I certainly believe in packing bees early as it causes a certain amount of disturbance and in packing early, they get a flight before winter sets in.

Foul brood has not spread in our county as rapidly as I anticipated it would. Mr. Stewart was in our district assisting the apiarists in combating both American and European Foul Brood, and I believe our beekeepers are rapidly becoming their own nurses and doctors, which is the only and surest way of dealing with foul brood.

We certainly had a good crop in Victoria County, and I believe in the whole Province. The "rains descended and the floods came," hindering farm work, but the clover grew and grew and grew and the first part of June, the fields of Alsike Clover were very beautiful to behold. Then at the opportune time Old Sol shone out, and mild weather combined with sunshine and very little wind, and with abundant moisture in the ground, resulted in a bountiful honey harvest.

With honey coming in so fast, you would suppose we would be very happy. So we were, but we had trials to contend with. One was trouble in securing containers as a consequence of the present war. It is rather exasperating not to be able to run the honey off before it candies. Another was extreme heat—98 in the shade, and 117 and 120 in the sun—think of that! We worked in the sun, and found it a little too warm for comfort.

I strongly advocate selling honey early. If the Crop Committee do not get out a report early enough, I would not wait for them. I have heard some speaking figuratively saying they had their honey stolen from them, meaning they sold it too cheaply, but this year I had some literally stolen from my honey house. Some honey thieves unlocked the honey house door, took some honey already packed and emptied one tank. So you see I have good reasons for recommending selling honey early.

The present year was a great year for bees swarming. For some time I have taken considerable pride in being able to prevent this state of affairs, some seasons having none at all, but this season, they swarmed six at a time, and once I thought

the whole apiary were going to swarm at once. I still think, however, had I applied the treatment soon enough, I could have prevented it to a certain extent.

I imagine at conventions we dwell too much on our successes and not enough on our failures. When I commenced beekeeping, I believed every word in "Gleanings in Bee Culture." Mr. Alexander was introducing eight or nine queens to a colony and expected to winter them too. I decided to introduce just one extra one, making it ten, figuring in this way: one queen colony produces 100 lbs. of honey, ten queen colony will produce 1,000 lbs., and 1,000 lbs. at the modest price of 10 cents equals $100 per colony. However, I soon found something was wrong with my mathematics, and after making many mistakes and losing many queens, I have found two queens will live together with an excluder between, sometimes. They will also live together without an excluder, sometimes. A virgin will become mated from super with queen below and *vice versa,* a virgin will become mated in lower story with queen above, and both store honey in same super, but rarely if ever will two or more queens winter in the same colony.

Mr. J. H. Burkholder, Glanford Station: The inability to secure containers has been mentioned; in our locality the honey came in, I suppose, at the same rate as the rest of the Province, but we had a way of meeting the emergency, and I do not think it is a bad way. Five-pound and ten-pound containers were hard to secure, but we found that 40 and 50 gallon barrels were very easy to secure; we could buy them for $1.50 apiece. They were good second-hand oak barrels. We scalded them out and waxed them, and by using them we were able to meet the emergency. We had barrels lying all around the yard, and as the honey came in, we put it in the barrels, and it was a very easy task to roll the barrels back into the honey house and fill our containers when we secured them. I would advise every beekeeper to have something of this kind on hand in case the proper containers cannot be secured when they are required.

Mr. A. E. Haines, Cheltenham: If the honey is left until it gets thoroughly ripened, it will not harden readily, and there is no trouble in putting it in the containers.

Mr. J. F. Dunn, Ridgeway: I think I can shed some light on the matter of honey candying. I have been told that honey left in the hive until fairly well ripened, does not candy. In the Niagara District, we have greater humidity than in any other part of Canada, and in the spring, we have the habit of putting an upper chamber on our ten-frame hives, and we let the queen go up there. We get a lot of honey in that way, and that is put aside to feed the bees in the winter. It was certainly thoroughly ripened and was very thick, and yet that honey candied. I think it depends a good deal on where you are.

We had some difficulty in getting containers, and when I sent down an order, they said they did not know whether they could let me have them or not, and then I sent down a big order that made them sit up and take notice. I told them if they got it out in ten days, I would send a cheque for them, and I got the tins in ten days—all I wanted, and nearly sufficient for next year. Tins will be very much higher next year than this year, and I do not think I will lose anything by giving a good order.

Mr. J. A. Marshall, Binbrooke: We also had trouble in getting tins this summer; we could not get them as fast as we wanted them. We got the idea into our heads that tins were going to be dearer another year, and a few months ago I put in my order for next year's supply, and I have them on hand at the present time. I can use them whenever I want them next year.

MR. C. P. DADANT, Hamilton, Ill.: I would not like to have the impression go out that honey will not granulate. Our honey does granulate, but will not granulate so readily when it is well ripened. Mr. L. C. Root, a son-in-law of Mr. M. Quinby, came to a meeting we had in Syracuse, New York, in 1881, and he had with him a jar of basswood honey which was absolutely liquid, and this was in January. When he turned the jar over, the air would go very slowly through it to the top. He said the reason it had not granulated was because it was very ripe. Wherever we have had very ripe honey, it is slower to granulate than honey that is not fully ripened. We put our honey in barrels when we first harvest it, unless we have orders to fill. We find it convenient to haul the honey in barrels, and it settles in the barrel, and we do not have to clean it when we take it out. It is not difficult to take honey out of a barrel that has granulated if you know how to do it. We use alcohol barrels, and they are gummed on the inside so that they do not leak, and all we need to do is to tighten the hoops on them. We never moisten them; we simply drive the hoops very tight so that the barrel will be sure to be well bound, and then we put the honey in and set the barrel up on end. If you intend it to granulate, it is better to have it on end, because then the little particles of wax will come to the surface, and if the barrel is short a half gallon of being full, it will not touch the head. When we want to take the honey out of the barrel, we mark with a pencil the head and staves, so that we will be able to put everything back in the same position, and the barrel will be as good after we empty it as it was before. Then we drive the hoops up with a hoop chase and mallet, and then tap the staves gently with a mallet until the hoop is loose, and if the head does not stick to the honey, it will drop on the honey, and then we screw a gimlet into the centre of it and lift it up. Of course, if it sticks to the honey it will be more difficult to get it off. It is better not to have a barrel too full, and then the head is not apt to stick. We then take a brand-new spade and shovel out the honey. We find that is the best implement for handling granulated honey. After the honey is out, we put the head back, holding it with the gimlet, and drive the hoops gently together, and I can assure you you can put the liquid honey back into that barrel and it will not leak, because everything has been put back in its proper place. Once we poured in hot honey after it had been melted. A man ordered a barrel of liquid honey, and we took it out of the barrel and poured it in again hot, and the honey evaporated the moisture out of that barrel, and when we went to it the next day, about a third had leaked out. Since that time, we always wait until the honey is cool before pouring it back into the barrel.

THE CHAIRMAN: Don't you think the honey will granulate quicker if it is put from the extractor into the container?

MR. DADANT: If you pour it in from the barrel to the vessel it will granulate at once.

A MEMBER: Do you use new barrels?

MR. DADANT: We always use second-hand alcohol barrels. We have in our vicinity a medicine company that uses alcohol in making its medicine. These barrels contained alcohol at first. Before we put the honey in, we tighten up the hoops.

MR. MORLEY PETTIT: What is the capacity of the barrel?

MR. DADANT: 50 to 52 gallons.

MR. J. D. EVANS, Islington: One gentleman said this was an abormal season for swarming, and I think that was correct, because I have never had any trouble in preventing swarming until this year. My system it to put a top story on and

allow the bees to run through the two stories, and then when there is danger of swarming, which is generally about the time the white clover is ready to come in, I take a modification of the Demaree system—that is to raise all the brood except one comb, and fill in the rest of the hive with sheets of foundation. That certainly prevents swarming, but I do not like it altogether, because I have found that very often some of the sheets were not drawn out, and I had to take them out in the fall and put others in. It seems to be too great a check to the queen laying, and I have been using various forms of the Demaree system, and when the time comes to lift the brood up, I shut off the brood and the queen is left at the bottom, and then I put in three sheets of foundation and fill the rest out with drawn comb. I have found up to the present, that has worked splendidly.

When we started to extract, we waited as long as possible to allow the honey to ripen, and then we found about eight per cent. of the hives were swarming, and we went to examine in order to see what was the matter. We found that the bees had filled up the two sheets with brood and had also filled two or three sheets of foundation, and the rest of the combs they had jammed full of honey. The ten frame hives had five or six combs full of honey in the bottom of the hive, and the queens were crowded out and had no place to lay. The question that puzzled me then was should I take that honey out or leave it in? There was great temptation to take it out, but as I remembered sugar was going to be dear, I left it all in to save feeding, and when the bees swarmed, we went through them and took out some of the honey and put in foundation, and that stopped the swarming.

I never had that system fail until this year, but there was such a tremendous rush of honey this year that they filled up these frames and the queen was crowded out.

MR. DUNN: I remember when Mr. Demaree brought out that system some years ago. It is all right in Kentucky to do that sort of thing, but I can never make it work.

In the spring when the fruit bloom comes out, another brood chamber over all colonies, and when we see the first white blossom and if the queen is below, if you have a good smoker, you can smoke her down, and then we set it off to one side and put on a queen excluder and put on one or two sets of combs. In ten days there will be some queen cells ready to get out, and that is the time we set them off to one side if we want an increase, but usually we do not want an increase, and we let all the brood hatch out, and then we have a lot of brood combs filled up with honey, and you can extract that if you are short of extracting combs. If we have any weak colonies in the yard, we put it up there, and we always have a nice lot of combs to put in wherever they are needed. I think that is a nice way to control swarming. I got this idea first from Mr. Armstrong, and I thanked him for it before, and I want to thank him for it again now. I think we owe Mr. Deadman a big vote of thanks for the invention he showed us last Convention for cleaning out the supers. It is about as nice a thing to get comb honey as we have.

MR. HABERER, Zurich: I put some empty supers on, but somehow my bees have their own notion about things, and they cleaned these combs pretty well, but they did not carry the honey back to the supers above the colony. They gathered it and left it in some of these supers. We put our supers out in the apiary and get them cleaned out. We cannot get any other satisfactory way of getting combs clean.

MR. G. A. DEADMAN: With my device, all that they leave on the stand does not amount to anything. The supers you put around the colony cannot be cleaned

up as nicely as when you put them outside, but you do not want them cleaned any better than they will be cleaned.

MR. HABERER: You do not need to leave them out long if you put them outside.

MR. DEADMAN: We have been practising that system for years, and we find it works perfectly satisfactorily.

MR. DUNN: You will find the colonies that are doing the cleaning out are very, very strong. I never saw stronger colonies in my life than the ones that were doing the cleaning out.

MR. DEADMAN: As Mr. Dunn says, they do better work and are strong. You need not fear about any honey being left in the cells. It is splendid for unfinished sections, because they will do all that cleaning. I think Dr. Miller recommends putting the supers in the cellar, but that is not necessary.

MR. MEYERS, Stratford: If the entrance for the bees is not right, they won't clean out the supers; is that the case?

MR. DEADMAN: They go underneath the supers. The stand is large enough to hold the colony in the centre, and there is a pile of supers on each front corner and three behind. All you have to do is to arrange the opening underneath these supers connecting with the main hive, and the bees walk underneath. You must leave room between the supers for the cover to go on, and that leaves the supers two inches apart.

MR. MEYERS: Do you have the bottom of that so that the bees can get from any row of supers to another when going to the original hive?

MR. DEADMAN: Yes, they can go direct from the hive to each row of supers. They can reach any super from the hive itself, and when they clean out a super they bring that honey to the hive and store it above. One year we had American Foul Brood, and we put supers from diseased hives all on one stand, and the strange part about it is that the colony that did the cleaning of this foul brood, did not have foul brood.

THE CHAIRMAN: We have a representative of the American Can Company with us, and perhaps he can explain what his company will be able to do for us in the matter of cans next year.

MR. T. W. BRETHOUR, Hamilton: I am very glad to be here representing the American Can Company. We have two factories in Ontario, and one in Manitoba and another at Vancouver. We have never made any great effort to get the honey-pail business, because we did not know it was as large an industry as it seems to be. The situation in cans at the present time is complicated by the war. Tin plate is hard to get. Tin plate is about 98 per cent. steel and 2 per cent. tin, and steel is a commodity that is used to a very large extent for war purpose. But I do not know of a single instance where we have seriously inconvenienced any of the trade that we were manufacturing for last year. We intend to go after the honey-pail business stronger for next year, and we are going to make both the plain and the lithographed pails. We intend to make 2½-pound pails, 5-pound pails, 10-pound pails and 60-pound pails. Of course the further ahead the beekeepers are in placing their orders, the better it will be for the manufacturer. It takes us seven or eight months to get tin plate to-day. I feel sure we will be able to furnish you with all the pails you want for next year, and I hope the demand will be larger next year than it was this.

MR. E. T. BAYNARD, Lambeth: We used these cans last year, and the only

trouble we found was that they had the net weight and were not as well tinned as some of the pails we had been having. We found there was nearer 99 per cent. iron than 98, but this American Can Company is a good reliable firm to deal with.

MR. BRETHOUR: If there is any trouble with rusting, you can have the pails lacquered for a small extra charge.

MR. HABERER: I had some cans lacquered some years ago, and nothing would take that lacquer off, and I found it was a very good plan to have the pails lacquered inside, because you always have a clean can. Last year I had all pails lacquered inside.

THE CHAIRMAN: I think if it does not cost too much it would be a good investment to have all the cans lacquered.

MR. HABERER: The company charged me something like a quarter of a cent per pail, or in the neighborhood of $2.00 for a thousand pails.

A MEMBER: If you empty a 60-pound can and do not wash it out, you will find that inside the opening it will be black, because there is only a thin coating of honey in contact with the air, and somewhow or other it gets black.

A MEMBER: We should put our honey in good tins, and I think we should all use the lithographed tin.

THE PRODUCTION AND MARKETING OF COMB HONEY.

S. B. BISBEE, CANFIELD, ONTARIO.

When last summer Prof. Pettit invited me to speak at this meeting, I wrote him that I was afraid as I was a user of the Heddon hive and system, it was probably not advisable, and that it would be better to have this subject taken up by someone who used the Langstroth hive; as I think most of you here are users of that hive. However, I will do my best to interest you for a few minutes.

Now, I hope I will not be misunderstood. I am not advocating the use of the Heddon hive. I am not advising any one to adopt it. In fact, I have come to the conclusion that while I believe it to be the best hive for the apiarist who makes beekeeping his chief business, it is not a very satisfactory hive for the beekeeper who only wants to keep a few bees; but in any event to be a success, not only the hive but the system must be adopted. The hive without the system will be pronounced a failure.

Just here I might say something of the hive I am using, which is made after the style of the Heddon, but with ten frames instead of eight. Colonies are wintered in two of these sections, which have a capacity of 12½ Langstroth frames. There is no difference between the sections for brood, extracting or comb honey supers. Any section may serve for either purpose.

The comb honey super is fitted with six section holders, fence separators and an extracting frame on each outside. These outside frames serve the double purpose of helping to start the bees to work at once, and also to keep the pollen out of the sections. They will also greatly lessen the number of unfinished sections.

Now there are some points we might consider before we get busy with the honey crop, and I wish to impress upon you the necessity of getting the comb honey supers ready before you want to use them.

I notice so many beekeepers waiting until the honey flow is almost on before they order their sections. They are waiting anxiously for them long before they arrive, as the supply houses are, at this time, overloaded with orders, and it must be very hard to supply the demand at this season. However, when they arrive a rush is made to prepare the supers, the sections must be put together. It is almost impossible to put full sheets of foundation into sections like this. Starters may be used; but I do not like them. An attempt is made to use as full sheets as possible, and after fixing in the foundation, the section is placed in the super, and an attempt made to square up the section, with the result that the foundation becomes buckled and results in a cull section, probably fastened to the fence with brace comb, and is at best a mussy, unsatisfactory section, practically unmarketable.

The sections must be ordered and on hand some time before needed. It would be well to have the sections folded and placed in the supers at least two months before needed and stored away. Then shortly before the honey flow it is gone over again, the section holders taken out, when it will be found that the sections have become set and are square. The foundation should now be put in place, and the section holders returned to the supers when they will be ready for use.

We will now take a look at the bees. It has been said that the time to prepare for a honey crop is the season before. This may be true, but I do not know that it will benefit us to dwell upon that or upon the spring management, which would be different whether working for extracted or comb honey.

We will assume that you have taken as good care of your bees as you could, and that the bees here about the 24th of May are an average apiary, some strong, others fair, some weak. Some exceptionally strong colonies are showing signs of a tendency to swarm, and are given another section of drawn combs, usually below the two sections that up to this time have made up the brood nest, and in these colonies, I prefer to use a little smoke at the top, driving the queen out of the top super and inserting an excluder below the top super, or, probably better, transpose the two brood chambers, placing the bottom one on top, leaving the honey in the centre, in order that the bees may not be stripped of their honey. When a few days later, if they are still uneasy, I would now shake all the bees from the top super and place it on a colony light in bees. This will not tax the strength of the light colony, as all larvæ will be sealed.

The average colonies are, about June 1st, given an extra super of combs, which should be very clean and white if it is intended to use them for comb honey. In the selection of colonies to be worked for comb honey, I notice considerable difference as practised by different beekeepers. I believe the users of the Langstroth hive use their strongest colonies, while some who use the Heddon hive wish to use the average or medium colony, leaving the very strong and the weaker ones to work on extracted honey, as they say the very strong are sure to swarm, while the weak are no use.

For myself I prefer a good strong colony when after removing the brood in the manner I will describe, I have very little touble with the swarming problem. The queens should be driven down a few days later to the bottom brood case and an excluder placed above, confining the queen to the one brood case. It would be well a few days later to clip all the queens and place an average colony on the scales.

The honey flow which usually commences about the middle of June, is shown

by the scales to be just starting, and a super of white extracting combs is placed above the excluder on all extra strong colonies. Should the weather be favorable and the scales show a good flow to be on, I now put in the comb honey supers, using the best filled frames from the extracting supers on the outside of the comb honey supers. These are placed just next above the excluder and work should be begun on them with a rush. The outside sections if anything will be started first, but usually there will be little, if any, difference. As work is well started in the super, another comb honey super is given below and the bees shaken from all extracting and brood supers above, these supers may be placed upon weak colonies to finish up, used for increase or for mating nuclei. I find that a frame from the brood nest with the brood about half hatched leaving just a few young bees, and another frame partly filled with honey, makes a very fine nucleus for the mating of queens. Here again I find the Heddon hive very convenient, as most of you know I am rearing queens for sale, I have 100 made up with three division boards in, leaving room for four of these nuclei, giving an entrance from each of the four sides, and use about 400 nuclei.

If not needed in this way and increase is not desired, it is a good plan to place this case of partly filled brood and honey on a bottom board beside the old hive, giving a ripe queen cell or a virgin queen, and as soon as the honey is off they are ready to unite with the old hive.

You will notice that we have our comb honey colonies with white brood combs below, capacity 6¼ Langstroth frames. You will find that the bees will work better above a brood chamber that is wide and shallow, or, in other words, where the brood comes right to the outside and entirely under the comb honey supers, than where a deep frame is used, and the brood nest contracted by putting dummies at the outside as practised by some. We use the white combs for the brood chamber, so that the sections may not be stained by the bees travelling over them. The condition is now ideal for the production of comb honey. The colony is the nearest approach to a natural swarm possible. It is almost a modification of the shook swarm only accomplished gradually without any disturbance. There is very little danger of the colony swarming if sufficient room is provided for the storing of the honey crop.

There are now no young hatching bees in the hive. The brood combs are all nice, clean and white, just capped over, solid sheets of young brood. The sections will not be soiled if they have not been put on too soon, that is before the honey is coming in. They will be nearly as clean and white when ready to come off as when first put on. The bees are also at this time too busy gathering honey to bother about propolizing or gumming up any crevices about the sections.

Should the honey flow be good and the work going on well in the supers, we would place an empty comb honey on top of all.

It is surprising how often work will be started in this empty super away at the top of the hive, when we think the bees have plenty of room, and as the bottom super becomes half finished, this top one is placed underneath and an empty again put on top. It is not usual for the bees to swarm if plenty of room be given at the proper time, but should they swarm, I would hive them on the old stand on a section of drawn combs, or at least four or five combs and the balance foundation, and place the supers back on the hive just as they were before. Never hive a swarm to be worked or working on comb honey on all foundation; if this is done, the bees are certain to carry the pollen into the sections.

It will be necessary to put an empty super without frames underneath for two or three days to provide a cluster space, otherwise the bees will very likely swarm out. I have only upon one occasion had a swarm that would not work on comb honey.

We usually notice about this time that some have been given too much room, while others seem to be ready for another super, and as we are doubtful about starting work in more supers, one is taken from the colonies that have too many and given to the others that appear to need more room to finish up.

We are now anxious to have all the sections well filled, and yet we want to give the bees all the room they need, but as we are in doubt of the honey flow lasting to fill more comb honey supers (our honey flow here is of very short duration, sometimes lasting only about ten days or two weeks), we now place an extracting super of foundation on top of all. This will be used if needed, but the bees will not neglect the sections below to draw foundation at the top. Then, too, it would be allright to have frames for extracting partly drawn at the top. When comb is partly built in sections it nearly always spoils the sections for another year.

When the scales show that the honey flow is over, it is best to place the escape boards on at once and take off the comb honey. It will not be improved by leaving it on, as the bees will now begin to carry in propolis and stain up the sections.

The honey should now be wheeled into the honey house, graded and placed in good, glass-front shipping cases ready for market.

When I accepted the invitation to speak here, I overlooked the fact that I was also to speak on the marketing of the honey. So far I have had no trouble to dispose of mine at very good prices, about $2.50 to $3 a dozen. In fact, one customer who bought 35 dozen, telephoned me as soon as the shipment arrived, and when I answered the phone I was afraid that something had happened. He said, "send me more comb honey, it only lasted one day, I should have bought all you had." Yet this same customer was very indifferent when I took his order, as he felt sure he could buy cheaper. He could have bought cheaper, but he found that the customer was willing to pay the price for a really nice article.

Now I hope I am not appearing to boast of my honey, or infer that there was no other just as good, but in talking of the marketing of comb honey, I can only speak in a practical way of what I have seen in the different stores.

In one large house in this city, I found a shipment of honey sent in in the comb honey supers. It had been bought for No. 1. The honey was a very fair quality and not badly filled, it was not badly stained, in fact it was a good average as honey is removed from the hive. Some sections had brace combs built to the fences. Now you all realize how unsatisfactory honey in this condition would be to the retailer. It was being sent back with a letter that they could not use it. I am afraid that after being returned it would hardly be in a condition to be graded as No. 1.

In another store, I found honey shipped in the same way. It was sold cheaper than I could sell mine. The retailer would not buy mine at the price I was asking, so I asked permission to place a dozen on the counter beside it at the better price, and if it would not sell I would take it away. It was gone when I called again; but he would not buy any, for he said he could not sell the other while mine was there.

In another place, I found about a dozen baskets filled with sections wrapped in newspapers. There were all grades from cull to fancy. It had been bought for No. 1, and was being held while a settlement was being arranged.

There is after all only one way to put up comb honey. It should be properly graded, the propolis cleaned off and placed in glass front, no-drip shipping cases, carefully wrapped in a good strong wrapping paper, and placed in a suitable crate. If to be shipped very far by rail it would be well to put a few inches of coarse straw in the bottom of the crate to absorb the shock.

I had at one time thought to put all sections in a carton, which would have my name and address on, but after a limited trial I was not very well satisfied with the carton; while a nice thing to look at, I found that in use it became soiled at the bottom from any drip that might occur. It seems that the best use for the cartons, if one wishes to advertise, would be to send them with the shipment to be used by the retailer to slip the section in as it is sold. However, for the coming season, I expect to use a self-inking rubber stamp, placing my name on the wood at the side or top of every section.

Now, there is another market that I have neglected to mention, that is the retailers in our home towns. It is surprising how much they will sell when it is nicely put up and in a conspicuous place, where their customers can see it. Ask for the privilege to put it on their counters if they are slow to buy. Let them pay for it when sold. It serves two purposes, disposes of your crop, and by keeping other honey out helps to lessen the danger of disease.

I thank you for the attention you have given, and will hope that some of you will be able to extract some little gain that may be a help to you in the bee business, and where you see that I might improve my method, I would be only too pleased to have it brought out in the discussion that may follow, in order that I may glean something that will be a help to me.

D. ANGUISH, Lambeth: Why should there be any dripping of comb honey?

MR. BISBEE: I have not seen many shipments of comb honey but what there was some dripping if it stood very long. Any slight jar will crack a comb and make it leak. I have found some honey that was called No. 1 Fancy dripping quite a bit.

MR. J. W. PATTERSON, Vinemount: Give us your system for clipping queens?

MR. BISBEE: We have an old super somewhere around the yard, and we put four legs on it so as to bring it up about the height of a table. It is a very good thing to use with just an ordinary excluder laid on top, and over that I spread a piece of burlap, putting a tack in to keep it in place. Then I take some crude carbolic acid and with a brush paint over this. As I explained before, about the 1st of June or a little before the honey flow, we go around and drive all queens down to one case, placing the excluder just above the bottom case. We go over the whole yard in that manner. A few days later we go back and pick up the colony and set it on this stand right on top of the carbolized cloth, and you will hear a roaring among the bees in about half a minute. Tap it a couple of times around the edges in order to start up the queen, and in about a minute more it will be ready to lift up, and nine times out of ten you will find the queen on the bottom of the excluder.

I remember two years ago I left my home, then at Beamsville, and went to Grimsby, about seven miles, and I clipped all the queens that day. I was home early that day and I clipped seventy queens. You will find by using this method you will be able to locate your queen very quickly. It does not work so well in the deeper hives; it helps to bring them out but it is not so sure.

Q.—How does the queen get on the excluder?

MR. BISBEE: She tries to come up to get away from the carbolic acid. Should

you not find her there, stand your excluder on edge. The excluder, which we place just on the old case, is merely to keep the burlap in place and to keep it from sagging down too far from the frame. Anything will do just as well. I want something that the air can go through; three or four slats will do just as well.

MR. R. B. ROSS, Montreal: Do you use crude carbolic acid pure or diluted?

MR. BISBEE: I use it pure and I find one application will do for a couple of hours. I notice some drop a piece of fly screen on top of the burlap in order to keep the bottoms of the frames from coming in contact with the carbolic acid. I do not know that any very bad results would come from this, but it is probably a little better to do it.

MR. PETTIT: Just on that very point, I would like to say that I had a queen killed by dropping down on the carbolic acid, and this screen would prevent the queen from getting down there.

A MEMBER: How do you like the Heddon hive for wintering?

MR. BISBEE: I like it very well.

Q.—Do you use two shallow cases or one deep one?

A.—Two shallow cases. I think it is an advantage in wintering because there has to be a space between the two which allows the bees to pass halfway through. In a deep frame if the bees are out of honey, they must either go to the bottom of the frame or around and under in order to get at the combs, and possibly in a very severe change of weather, some of the bees, being unable to come in closely on the cluster, will get frozen unless you have something over the top of the frame so as to allow them to go freely over the top.

THE CHAIRMAN: The excluder is possibly one of the best things to put on to keep out mice. I have been bothered with mice and I always leave my excluder on when I am wintering outside.

MR. ANGUISH: Do you leave all your comb honey in until the flow is over?

MR. BISBEE: Usually we are too busy to take off any comb honey or extracted honey until the flow is ended.

MR. ANGUISH: Do you use a metal queen excluder all through the season?

A.—Yes.

Q.—Does it hinder the bees?

A.—No, I do not think so. I use a wood and wire excluder because I think they give more ventilation than the old zinc excluder. I think, possibly, in the production of comb honey, it would be all right to use a deeper frame. I am not an authority on the subject, but I do know that with a shallow super and where you crowd your queen down to a small brood nest, you require an excluder.

MR. ANGUISH: I raise a little comb honey every year, and I do not use an excluder at all.

MR. BISBEE: How large is your brood nest?

MR. ANGUISH: About 6½ or 7 Langstroth frames. I use two bodies together and I have done away with the excluders altogether.

MR. BISBEE: Just for a joke, I would say get some better queens.

MR. ANGUISH: That is quite a joke, and is all right for a queen breeder, but I notice some of these men don't get any bigger crop than I do.

MR. JOHN NEWTON: I do not produce much comb honey, but I never forget asking Mr. Shaver some years ago that same question about the use of the queen excluder, and his answer has always stayed with me since. He said, "I do not want the drones to make door mats out of my nice comb honey, and if it is for nothing else than to keep the drones down, I say use the excluder."

MR. ANGUISH: Why should you have any drones?

MR. BISBEE: I have sometimes had queens that would work in a brood nest like that, but I do not raise any queens from them nor do I keep them over until the next year.

MR. NEWTON: The excluder is not for the purpose of keeping the queens down, but for the purpose of keeping the drones down.

MR. BISBEE: Did you ever notice that when you have no excluder on the bees will carry some pollen into the sections?

MR. ANGUISH: No, I do not think so.

MR. BISBEE: If you hive a new colony on foundation you may put an excluder on and put sections on, and they will not carry pollen into the sections.

MR. DUNN: I use the Langstroth hive, and I do not think there is any trouble about the queen going above. This gentleman says, "Why should we have any drones?" I have been quite an extensive comb honey producer, but now I am producing extracted honey, and I think that the wire queen excluder which we now have is very much superior to the old one, and there is certainly no hindrance to the bees. I never had a queen get through any of mine, and as far as producing comb honey is concerned, I would say use the excluder, because we can get a big yield with a hive like that. When a man tells me he got 150 pounds of comb honey under certain management, I say to him, "You might have got 200 by better management." I think you would get a still larger yield if the brood chamber was large enough to accommodate the queen, and I think I would have a larger hive.

MR. ANGUISH: At the time of the year when the honey flow comes on, we do not care whether that queen is laying a greater number of eggs or not. She is actually storing honey for two weeks, and if we can get them to store honey, that is what we want.

MR. BISBEE: I believe bees get the stain on their feet by travelling over the old brood combs. I wish to make it plain and to reiterate that we give the queen all the room she can possibly use up to the 1st of June, or within a few days of the commencing of the honey flow, and after that we wish to contract. To leave on three or four combs filled with brood would simply mean the queen would cease brood rearing and allow about 40 or 50 pounds of our very best honey to be put into the old brood combs, and that is the reason we contract.

THE PREVENTION OF SWARMING.

C. P. DADANT, HAMILTON, ILL.

There are many methods for the prevention of swarming, but they are nearly all by manipulations which require a great deal of time at the busiest season. The method which we sustain as the best and which I propose to describe requires no active manipulations during the honey gathering period, outside of supplying the colony with ample supers and is what might be properly called a "let-alone" method.

As early as 1870 we found ourselves with a sufficient number of colonies to make swarming undesirable. Besides the objectionable increase in numbers, natural swarming caused an increase of labor, when we were busiest. The method which we adopted then has been in constant use ever since, with additional improvements. As to its success, the past season is ample evidence. Out of about

525 colonies, spring count, we gathered less than 30 swarms, but harvested over 200 pounds of honey per colony, while a neighbor of ours gathered 12 swarms from 5 colonies, owing to his neglect of proper attendance to their needs. The requirements are as follows:

1. An ample brood-chamber for the needs of the colony. If the queen is prolific and finds herself confined to a scanty lower story by queen-excluders or otherwise, she will make it known to the bees or they will instinctively notice it and prepare queen-cells.

As an outcome of this first proposition, there must be ample room for stores. Some novices are astonished to read of old practitioners like Dr. Miller placing as many as three supers at once over a strong colony. But if the queen is very prolific and has been breeding plentifully as nature dictates, her colony may be able to work in each of two supers as strongly as they would in one. Dr. Miller uses two 8-frame brood-chambers previous to the honey crop, when the queen is prolific She can thus develop her fertility to the greatest extent.

2. The use of comb foundation in full sheets in the supers when working for comb honey, or of full combs in extracting supers, has also a great effect on the prevention of swarming. True, swarming is much less likely to occur when supers are given of fully built combs, but comb foundation also helps greatly. There are days when the crop is so heavy that all the available cells are filled with fresh nectar. If the bees have to build more comb and thus find themselves crowded for room to deposit their loads, swarming may ensue. But with full sheets of foundation in every section, the labor of building additional comb and producing sufficient wax for it is much reduced. The supers must also be placed upon the colonies before they have become crowded for space, or they would readily get the swarming impulse which is next to impossible to overcome by any manipulations when once the bees have acquired it.

3. It will be entirely useless to expect the bees to remain contented and fill the supers, if the ventilation of the hive is not adequate to the requirements of the enlarged population. All observers have noticed the great tax imposed upon them by the simultaneous increase of heat brought about by a summer temperature and a daily addition of some 3,000 or 4,000 workers hatching in populous colonies. Thousands of colonies are compelled to leave a part of their population idle, hanging on the outside of the hive for days and sometimes for weeks, because they are unable to sufficiently ventilate the inside of the brood-chamber and supers. We raise our hives up from the bottom-board from a half inch to two inches, when there is a likelihood of the bees being unable to remain inside. We have even set the supers back, a half inch or so for a short time, so as to have a current of air through the front of the brood-chamber in very hot weather. This, however, must not be continued too long. But the bottom ventilation must be ample, sufficient in fact to allow all the bees to work, so that none remain clustering on the outside during the continuation of the honey crop.

4. As help to ventilation, by decreasing the heat, a good roof is needed when the hives are exposed to the sun. We use coarse roofs on our hives at all times. These are made of large discarded drygoods boxes and are flat. They are cleated with a 2-inch scantling across the rear underside and a 1-inch scantling in front. This secures a slope of an inch from rear to front. These roofs are also useful in sheltering the hive tops from the effects of the weather and help to preserve them in good condition.

5. The queens must be young. Some beekeepers believe in requeening every season after the honey crop. I do not believe in so radical a measure. I believe

a queen in her second year is fully as good as in her first season. But if she has proven inferior she should be superseded. Old queens which are losing their fertility during the busy season are a frequent cause of swarming. The workers prepare to supersede them by raising queen cells and the old queen, in a pique, leaves with the swarm. So we must see that our old queens are replaced in the fall or late summer.

6. A large number of drones is an incentive to swarming. Some of the old time beekeepers thought the drones were beneficial because the colonies having many drones swarmed readily. Swarming was then considered a desirable thing, since dividing or artificial increase was not thought of. The excess of drones does indeed promote swarming. Those big noisy fellows remain in the hive, in the way, all day long, except for a flight during the warmest hours, being then still more in the way of the active workers. No doubt, as Dr. Brunnich says, there is a certain fondness for the drones or males, on the part of the workers, during the crop, which changes to hate when the crop is ended and they consume the hard-earned stores. But they are at all times much in their way. In a state of nature, according to the best authorities, the bees build from one-seventh to one-tenth of their combs of drone size, in the brood-chamber. If only one-twentieth of the combs of a normal colony were filled with drone brood this would still supply nearly 2,500 drones per colony. We should permit only our very best colonies, and only two or three of these to raise such a large number of males, as 5,000 to 10,000 drones are ample for any apiary. The other colonies may be deprived of their drones as nearly as possible, for it is probably impossible to entirely prevent the rearing of any drones. But from 100 to 300 of these useless consumers per colony will be of small importance. It is not only necessary to remove the drone-comb early in the season, it is also indispensable to replace it with worker comb at once, for the bees will almost invariably replace drone-comb in the same spot, if left to their own ways.

It has often been stated that bees will tear down worker comb to build drone-comb. This I believe is an error of observation. Four different experimenters, to my knowledge, have tried the hiving of swarms on a hive full of drone comb. In each of these instances the bees have followed the same method. After some hesitancy, they did not tear down the comb to rebuild it, as might have been expected, but simply narrowed the mouth of the cells to worker size and the queen laid worker eggs in them. Is it not probable that if the bees were prone to tear down one kind of comb to rebuild in another, they would have done it in these four cases? The names of the experimenters who tried this are T. W. Cowan, editor of the *British Bee Journal*; E. Drory, of Bordeaux, former editor of the *Rucher Du Sud-Ouest*; Dr. Brunnich, of Switzerland, and myself.

There are instances, however, of bees building drone-comb on worker foundation. They are rare and are usually due to some defect of the foundation which may have been stretched accidentally in the laminating, so as to widen the cells. Mr. Crane, of Vermont, mentioned to me having had a dozen sheets of foundation thus changed out of some 2,000 sheets of this material during the past summer. These are only accidents.

When we replace the drone-comb with worker-comb, we do away with undesirable drones, for the mating of the queens; we save food which would otherwise be wasted, since the drone costs at least one-half more to rear than the worker and has to be fed as long as he lives. Beheading drones in the breeding cells is a waste, for the queen will again lay drone eggs in those cells. But the worst method of drone prevention is the using of drone traps, which hinder the workers more

than the drones would. Replace your drone-combs with worker-combs in the brood-chamber early in the season, or let the drones alone, after they have been reared.

7. The seventh and last of what I consider the requirements for the prevention of swarming is the spacing of the frames of the brood-chamber 1½ inches from centre to centre, instead of the usual spacing of 1⅜ inches. The bees work as satisfactorily in combs spaced 1½ inches as in those with the narrower spacing. But there is a greater comfort for them in the wider spacing, which adds a total of about 160 cubic inches to the narrow breathing and habitable space of an 8-frame brood chamber. Think of the large number of bees which may be accommodated in such a space.

The standard hives of the present day are nearly all of the narrower kind. Nevertheless the broader spacing is much the better, both for prevention of swarming and for clustering in the winter, since more bees can hang between the brood combs. My attention was called to the former advantage during the past summer, by Mr. Allen Latham, of Connecticut, one of the most observing bee-keepers I have ever met. We have used the wider spacing for years, as more convenient, without realizing until lately that it was one of the causes of our success in avoiding swarming.

Let it not be understood by any one that I lay claims to the total prevention of swarming. That is impossible. But when I see practical beekeepers such as I met the past summer in the vicinity of Syracuse, report as many as eighteen swarms out, in one apiary, at one time, I feel that there is a general need for more thorough understanding of the usual causes of natural swarming.

I am asked whether we have a non-swarming breed of bees. No, neither do I think we can ever get a really non-swarming race, if they are placed in circumstances that will induce their natural propensity to become developed.

The advantages of the above method are the doing away with hive manipulations during the honey crop, such as cutting out queen-cells, taking out brood, shifting stories, etc. All the required work, outside of increasing the ventilation and adding supers, has to be done during the dull season. I know that those who have excessive swarming, who will try this method, will find themselves greatly relieved by the results.

A MEMBER: You allow some drone comb in the upper story?

MR. DADANT: We started raising extracted honey before the practice of using comb foundation, and we saved every piece of comb, and as we did not want drone-comb in the brood chamber, we used to put our drone-comb in the supers.

MR. DUNN: Would you have any objection to the drone-comb in the supers if you used a queen excluder?

MR. DADANT: Unless you use the wire excluder, there is no doubt these excluders prevent ventilation. I have no use for the queen excluder for supers or anything else. The zinc excluders must prevent ventilation. I would prefer to use all worker foundation in the supers.

MR. DUNN: You will not have much pollen in the upper story?

MR. DADANT: No, we are not troubled with much pollen or brood in the extra supers.

Q.—Did you ever see pollen in drone-comb?

A.—No, I do not think I have, still I do not want you to take it for granted

that I said there never was. I am not in favor of drone-comb. My father held that the bees did the queen's will in building comb. Whenever the queen becomes tired, then the bees build the kind of comb that is quicker and takes less wax.

Q.—Don't they build drone-comb when there is an extra flow of honey?

A.—My father said that if you gave the bees half sheets of foundation, then the bees are away ahead of the queen, and the rest of the comb would be drone, the bees get ahead of the queen, and therefore they say she does not need worker comb. If the queen needs room for laying, I think you will all recognize that they build more worker-combs. Another theory my father had was that the queen preferred to lay eggs in worker cells until she became tired. He said that the eggs as they passed from the queen became impregnated, and that gave the queen pleasure, but in time she became tired of that pleasure, and it would become a pain instead of a pleasure, and then she wanted drone-cells so as to let the eggs pass without impregnation.

Q.—Won't two swarms together build more drone-comb than one small swarm?

A.—Probably, because then the bees can get ahead of the queen.

Q.—What width would you prefer to have the inside of the hive?

A.—We would never make it less than 12 inches. We prefer to have room for one frame more than we use. We have ten frames hives, but we have room for eleven frames, and one of them is a dummy.

Mr. Bisbee: I understood you to say that you would take the drone combs from the upper story, and put them in the top of the hive?

A.—No, remove them and melt them up. We did put them in the top of the hive at one time.

Mr. Bisbee: Interfering with the brood-chamber in March or April will cause the bees to ball their queen?

A.—We do it at a time when it is convenient for us, it is a question of location. The time to do it is before your honey crop. The condition of the crop must guide us, we do not want to manipulate our bees during the honey season, because that is a time when we have so much to do. The removal of the drone-comb must be done when it is lightest with honey. When they fill their combs with honey the space between is reduced, and you have more room for your bees to cluster with 1½ spacing than you have with 1⅜. The spacings in straw-skips are very irregular.

Mr. Burkholder: I advise always using foundation, and do not give the drones any consideration. I have seen where the bees have contracted the mouth of the cell and have put in worker eggs instead of drone eggs. If they want drone-cells they will enlarge them, or tear some of them out to make room for the drone cells. I do everything I can to prevent drone cells, in case of emergency they will build them.

Mr. Dadant: I think there are cases in which we want to raise drone-comb, if we have select colonies that we want to breed from, because we will enhance the chance of raising good breeders. We will not only have good breeders for ourselves, but for our neighbors, and if you improve your neighbor's stock, sooner or later it will improve your own. What we succeed in doing is to avoid a large number of drones. In one-twentieth of the combs of a ten-frame hive you can raise 2,300 to 2,500 drones.

Mr. W. A. Weir, Toronto: Can you tell us the marks of a good queen?

Mr. Dadant: The best breeders I have known looked very small.

MR. WEIR: Do you judge then entirely by their performance in the hive?

MR. DADANT: I judge them by the amount of brood they are raising. Sometimes the bees try to replace a queen when she is not failing. They simply do not love her, and they have never become accustomed to her. Of course this is an exceptional case. I think, as a rule, we should judge the queen by the amount of brood she produces, and also by the regularity of the brood. A good laying queen apparently begins laying in the centre, and that is one reason why we prefer a deeper frame. When the queen is in good laying trim, if she doesn't find cells she drops the eggs. If you put a black sheet under a swarm of bees, in a little while you will find the eggs of the queen in that sheet.

Q.—Have you observed in full sheets of foundation that the bees are prone to cut the corners out and put in drone cells?

MR. DADANT: Sometimes when the bees are not building on foundation very rapidly, they will use parts of the wax of the foundation to build other combs. If you give the bees an empty frame in the centre and watch what they do, you will see that the wax from which that comb will be built will not all be white, some of it will be dark, showing that they take wax from other parts. They always change the foundation. You can always tell where a colony has worked on foundation. I do not suppose they consider it as comb until they have started to work on it, and just as likely as not they will cut it.

MR. BISBEE: Might it not be possible that whoever put in that foundation stretched it a little? A. Yes.

A MEMBER: I came here to be instructed on the prevention of swarming. Mr. Dadant comes from a country of good crops. I come from a district of light honey crops, I have four yards. In one I have eight frame Langstroth hives. In another I have one and a half story Langstroth hives. One with ten frame Langstroth hives and one with twelve frame Langstroth hives. They were very strong last fall and strong this spring. They were unpacked about the 1st of April. Immediately the supers were put on, one followed by the other in the course of about a week. They were raised up from the bottom by inch wedges. In spite of everything I could do, these bees started to swarm about the middle of June, and they kept it up until September, until I had from 40 to 90 per cent. swarming.

MR. DADANT: I would not call that a poor place for bees?

THE MEMBER: There is very little alsike in our district, the bees were breeding as fast as they could. The honey crop averaged about 70 lbs.

MR. DADANT: Don't take this year's crop as an indication that we always have good crops. Last year's crop was not nearly so good. There is a lot for all of us to learn.

MR. PETTIT: One thing in connection with the gentleman who has just spoken is, that his bees were ready before the flow came on; we generally find that a slow flow stimulates swarming.

MR. DUNN: I have seen years when the flow was slow, and we had more swarming than at any other season. I want to know what kind of drones are flying in my yard, and where they come from, and I would rather have one or two drone-combs in a good selected hive than to have the drones all over the yard. One good colony raising drones is all that we want. I don't want any of my drones raised in worker-comb, because they are mostly all small drones and they are not the kind we want.

ADDRESS.

DAVID RUNNING, MICHIGAN.

I am a beekeeper from Michigan, and I was President of the Michigan Association. We use the eight-frame Langstroth hive and we winter indoors entirely. When the colonies are removed from the cellar in the spring, they are left entirely alone until about fruit bloom. I refer to the apple and sour cherry. That is about the only fruit we have in our locality. About this time the colonies are getting more crowded in the eight-frame body, and we add another body just over it, without a queen excluder, giving the queen the run of the two stories. The queen almost immediately comes up into this upper story to deposit eggs, she gradually spreads the brood nests; from this time on the clover is beginning to yield slightly. At this time we leave one frame out and stand it at the entrance to get it out of the road, and then we rapidly lift the others and shake the bees off inside the body, and stand the frames at the back until we have them all shaken off. The idea is to get the queen below the excluder. We shake because we can do that quicker than find the queen. When we have the frames all shaken, we simply lift the top box off, and place on the queen excluder, and put on a super of drawn-comb, and then replace the super taken off and put it on top of the hive, making it three stories high. About a week from that time we come back again, and lift these upper stories off, take off the queen excluder, and set one frame out at the front again and shake the bees off the others, and set them back and replace with other drawn-combs. For the last year or so we have been using drawn-comb entirely and putting on the queen-excluder. If it looks as if we are going to have a good flow, we will put on another super of drawn-comb. We make the hives five and even six stories high. You must understand we have only the clover flow. About a week or ten days later we will come around and cut the cells out of these upper stories, and if more room is needed we give it to them. If weather conditions are such, or anything turns up that we cannot get around inside of ten days, then we do not do it until fifteen days are past and then we do not cut the cells, we simply turn the upper story around a little corner ways to make a little entrance, so that if a queen is hatched she can mate and go along in the upper story. The reason we do not do that until fourteen or fifteen days have elapsed is that we want to be sure that a queen has hatched, and that there is no danger of a swarm coming off from the upper story. If you give this entrance after the ten days, the first queen out will go with the first swarm. We have our bees in six yards and we try to get to each yard once a week, which gives us a day for a yard. We try to keep a little ahead of the work, so that if the weather is not favorable we do not lose a day.

Q.—You do not extract until the end of the season?

A.—No.

Q.—How do you store your surplus combs?

A.—We store them in the cellar and in that way the wax moth does not develop, and they are out of the road until it is time to put the bees in the cellar, and then we move them out of the road so that we have plenty of room in the cellar.

Q.—Your cellar must be dry?

A.—Our cellar is dry, I would not want to use a cellar that was not dry for wintering bees.

Q.—You do not have the extracted combs cleaned out?

A.—We do not, we use a power extractor and it does very good work.

MR. MORLEY PETTIT: What advantage do you claim in leaving the extracting until the end of the season?

A.—It is a nice time to do it, we do not want to extract when we are securing our crop. Quite often myself and my wife will take a vacation for ten days immediately after the clover flow is over, and when we come back our honey is in ideal condition for extracting, and we feel more like doing it. The honey is thoroughly ripened if it is left on until the season is entirely closed, and that is a big point when it comes to marketing your product.

Q.—Is the Michigan Association going to do any advertising next season?

A.—I don't know what they will do, a committee was appointed with regard to the advertising for 1917, what it will do I am not prepared to say.

Q.—What about leaving your honey on so long; are you not apt to get the different grades mixed?

A.—We have only one grade, we have no buckwheat to speak of. We have one yard that is located near a swamp, but the flow there does not come on until towards the 1st September, and of course we have our clover honey off by that time.

Q.—If you are taking off much honey at a time, what method do you find the best to clear the bees off the comb?

A.—The Porter bee-escape. When our colonies are five or six or seven stories high we put it under two; when we get closer to the brood-nest we put it only under one. If your colony was seven stories high, and you put it under three, they would go down in a night.

MR. PETTIT: Have you proved that point; that if you put it under the three next the brood-chamber they will go out so slowly?

A.—Yes, I have.

MR. PETTIT: We have had cases where they seemed to go out just as fast.

A.—There would be cases where they would, but where the flow is over, and has been over for some time, your bees will not move as rapidly as when it is just over. Another thing we do when we get lower down towards the brood-chamber; when we put the bee-escape in we lift a frame out of the centre of the hive just up four or five inches and let it drop back again. That breaks the cluster.

Q.—When do you do your re-queening?

A.—During the latter half of the clover flow.

Q.—How do you go about it?

A.—The last couple of years we have been buying our queens. We sort our bees in the spring, and we try to have the best Italian queens in the home yard. We try to have queens not more than two years old. To re-queen undesirables we quite often kill the queen and go to our most desirable yard, and cage queens and take them right to the other place and introduce them at once, and allow the colonies in the home apiary to re-queen themselves. The last two or three years we have bought a large number of queens.

QUESTION DRAWER.

(Answered by JAMES ARMSTRONG, Selkirk.)

Q.—What is the best plan to stop bees from robbing?

A.—In the first place keep a strong colony, it very seldom gets robbed. You should not leave any honey exposed in the yard when there is not much honey coming in. After the honey flow is over, partly close the entrance.

Mr. R. E. L. Harkness, Iroquois: Did you ever see a colony with a good prolific queen robbed?

A.—Yes, I did once. I was going my rounds, just between clover season and buckwheat in the County of Norfolk, the beekeeper was tinkering with his bees more than he should, and they were robbing. That is the only case I ever saw. He had left honey exposed in the yard, and the colony that was being robbed was very strong; but it was overpowered and cleaned out.

Q.—What would you do in the case of actual robbing?

A.—If a colony in one corner of the yard is being robbed, I would first try and locate the colony that was doing the robbing. They fly nearly directly across the yard. My first plan is to reduce the entrance, but not too much. Then I would take the colony that was being robbed and place it where the colony that was robbing had been, and place the robbers in the place where the robbed had been, and if you ever saw bees that were muddled, you will understand how these bees are. Changing the stands nearly always stops the robbing.

Q.—What about a permanent change?

A.—You can change them back if you wish. If you have a wire cage that you can place over the bees that are being robbed, that will settle the question for you.

Q.—Don't you generally find that the colony that is being robbed is queenless?

A.—No, not always.

Q.—Which is the best way to get increase? Buy bees from the south or divide your colonies in the spring?

A.—I would say that if you have the money, buy bees from the south. If you buy a pound of bees, no matter where you get them from, you must get some drones. Unless you have been in business sometime, I would not advise buying a pound of bees and putting them in on foundation. It would work, but I would want drawn-combs. I would advice buying two pounds of bees and putting them in on drawn-combs. That will give you a nice start.

Q.—Would you not be more apt to get disease if the bees had it when they were shipped?

A.—If you have any disease in the yard, the chances are you would find scales in the comb of American Foul Brood, and there would be danger of spreading it all over the yard. Unless I understand the business thoroughly, I would prefer to divide my own bees.

Q.—Is there any danger of getting foul brood with the bees you buy?

A.—Very little, the only danger would be in the honey they used to make the candy to feed the bees. We have the matter arranged now so that the man who ships the bees has to give a certificate that the bees in his yard are clean.

Q.—Why not use combs that never had any brood in them?

A.—I would prefer combs that had a little pollen in them, and you could give them one or two combs of honey. When I put my bees in I give them combs well stocked up with pollen, and also a frame of honey, and I see that they have plenty of stores, and the bees don't have to go out to look for anything.

Q.—What about giving them a comb of brood?

A.—That is like robbing Peter to pay Paul.

Q.—It is not necessary to rob Peter very heavily?

A.—I don't believe in taking comb from one hive and putting it in another.

Q.—Sometimes Peter has more honey than he can take care of?

A.—If you find that condition, then divide it up.

Q. Supposing you had twenty colonies of bees and wanted to increase them to forty; which would be the more profitable, to buy pounds of bees or increase the stock of bees on hand?

A.—I would buy pounds of bees.

Q.—Is a two-pound package of bees equal to the average colony that has been wintered over?

A.—Yes, I would say it was; I would prefer it.

Q.—In comparison of cost, is a two-pound package better than one-pound package?

A.—I just buy one pound, but I would suppose that two pounds would be better.

Q.—What time did you get that one pound?

A.—This year about the 20th May, but I did not get them in until the 20th of June. I put them in on ten frames of drawn-comb fairly well filled with pollen and one or two frames of honey. This was on the 2nd day of June. These pounds of bees without any more attention, with the exception of putting on supers, gave me in the neighborhood of fifty pounds of surplus honey, and nearly sufficient to winter the bees.

Mr. Webster: How do you introduce the packages; do you drop them in the hive or fix them on the comb?

A.—I tried shaking out on the comb. I finally just took four frames out of the centre of the hive and put the package down there and opened the top of the package and put the cover on the hive, and in two days after a good many of the queens were laying. I found in shaking them out that a good many of them took to wing and were lost.

Q.—Would it not be better to get your pound packages of bees at the time you were taking your other bees out of the cellar?

A.—That is a good point, get them as early as possible in the spring.

Q.—One pound of bees is too small for early in the spring, they would be liable to freeze?

A.—I do not think there is much danger of that, they put them up in six one-pound packages in a bunch. There are certain times in the spring that we have cold weather; this should be avoided if possible, get your bees when the weather is likely to be warm.

Mr. Baynard: We got our pounds of bees the last week in April, and we put them on a strong colony. We took a wire screen off one side of the cage, and left them there four or five hours. They have an entrance out on the side. We had eleven packages this spring, and one gave us 131 lbs. of surplus honey, and the average for the eleven was 45 lbs. We had one package with only 2 lbs. The principal advantage of the one-pound package is in the young bees, they go right ahead.

Mr. Chrysler: In buying pound packages of bees you are liable to get queens that are not right. I remember getting fifty packages from a dealer who was supposed to be all right. The bees arrived in good shape and they were good bees, but one-third of the queens turned out to be drone layers, and the other two-thirds were superseded before the season was over. This man from whom I bought promised to make everything right, but he could not because it was a direct loss to me. This year I got twenty-five pound packages from each of two dealers in the south. From one of them four or five queens were bad.

MR. ARMSTRONG: I am glad that Mr. Chrysler brought up this question. It has proved very successful with me, I have not had any difficulty such as Mr. Chrysler describes. I purchased sixty pounds with the queens, and there were only two queens missing in the lot.

MR. DUNN: I am glad Mr. Chrysler said just what he did, because it is true. With me most of the queens were missing. The ones that were left were not real strong queens. I think the long journey is against them. Still, it is the best way to make up for the winter's losses.

MR. ARMSTRONG: You get queens through the mail in mailing cases. It is arranged the same as you would arrange the cage to introduce a queen to a hive, the queen is liberated as they come along. Most of the southern queens come in too small cages.

MR. DUNN: They are not as good as the queens raised in Ontario.

MR. CRAIG: I had ten two-pound packages, and there was a greater percentage of dead bees in the two-pound packages than in the one-pound packages. I attributed that to the fact that there was not a sufficient quantity of candy in with the bees to feed them.

MR. MEYERS: I got twenty-five packages of three pounds each; next year I am going to get five-pound packages. Of course they were not as good as the very best colonies of bees, but they were very good.

MR. BISBEE: If I lived somewhere near a good queen breeder in Ontario, I would get my pound packages in the south and my queens in Ontario.

MR. ARMSTRONG: That could be done very nicely, but you have to introduce your queens to the bees.

MR. MEYERS: I don't think you could get your queens here in April.

THE CHAIRMAN: I would like to know the name of a queen breeder who could give us queens in April. I got some one-pound packages and some two-pound packages, and some three-pound packages, and I found that the three-pound packages were the best.

Q.—What about the expense of getting them?

A.—Three-pound packages cost me $3.

MR. HERSCHISER: I believe in robbing Peter to pay Paul. With these pound packages, I take a double-story hive and put in the comb that I want to introduce the bees to in the upper storey. I rob Peter of a comb of brood and put in the upper story with enough bees on it to take care of it while the bees from the pound packages are occupying it. The lower story has no comb in it, and the bees will soon go up and occupy this comb of brood. I think it is a wise plan to take this comb of brood from some other hive.

MR. EYRE: This pound package is one of the live questions of the day. I got five packages, and the bees were nearly all dead in all of them except one. There were no queens in the cages and three of the queens were dead. They did not come till the 19th of June, but they did fairly well, and one package gave fifty lbs of surplus honey. I do not see any benefit in getting a three-pound package if a one-pound package will answer the purpose.

I do not see why we could not arrange to order these packages through Mr. Pettit. I know we would get better service from these men if they thought the bees were coming to the Secretary of the O.B.A.

MR. ARMSTRONG: If you find they need a little feed when they arrive, take a flat paint brush and paint the sides of the cage with a good syrup.

THE CHAIRMAN: Before you try to take the bees out of the cage you should give them a good feed, give them plenty of syrup before you try to take them out.

THE PRODUCTION OF EXTRACTED HONEY IN SEVERAL APIARIES UNDER ONE MANAGEMENT.

C. P. Dadant, Hamilton, Ill.

Before commencing my talk, I will answer two questions that have been handed to me.

Q.—If you do not use an excluder, will the queen go up into the extracting supers?

A.—We have very little trouble with the queens going up into the supers, and we do not use excluders.

Q.—Do you use shallow or full sheets for extracted honey?

A.—We use a six-inch side bar in the extracting supers. We have five of these supers on the top of the hive. We use full sheets of medium foundation.

We began using out apiaries in 1870. We use a very large hive. Our method at first was to raise partly comb honey and partly extracted honey. Of late years we have raised only extracted honey.

The distance which bees will travel to harvest honey has a good deal to do with the location of the out-apiaries. We should not have an out-apiary in a district already covered by our bees. We are not positive, but we feel sure that bees go farther in one direction than they do in others. Where we are located, there is a valley, down the creek there are thick woods, across the way from our place is a hill with thick woods on it. We are very sure that the bees go up the valley where there is no timber. The Mississippi River is only a mile and three-quarters from our apiary. There is some low land down there, and we know that our bees never go there, but bees belonging to our neighbour do. We believe that an out-apiary four miles away will not interfere with the home apiary. We find that there is a great deal of difference in the honey yield from different locations. In the open prairie where there is no timber, we find that the white honey is much whiter than from near timber. Where there are sumach trees, we often find that our white clover honey is tainted. We do not transport our bees from one place to another. Our hives are very heavy, and when we place a hive in a spot it is just the same as if we built a house on that spot; it is there to stay. A big hive gives a large crop. On our eight-frame hives, we have two or three eight-frame supers, and on the ten-frame-hives we have eleven-frame supers. I believe in robbing Peter to pay Paul to a certain extent. If we have a queen that we know to be prolific, and if her colony has been accidentally weakened, I believe it is a good thing to help her, and it may pay well to rob some strong colony for that purpose. Another time that we think it is well to rob Peter to pay Paul is when the crop is near the end, and we do not care to bring any more supers to the apiary. Then we take half full supers from the strong colony and help out the weak ones. It is so much nicer to have all the supers full.

Our hives have a rim all around the edge on which the cap telescopes, and that gives us an opportunity to use an implement I will now describe to you. There is a projection on the side of the hive about a half-inch below the top, and our boys pry up the supers with a hive tool on these side blocks, and then tip the super and slide on the escape board. As soon as you lift it you place on the block. My son went fourteen miles to one of our out-yards and put escapes on sixty or seventy hives with this apparatus in a very short time. One man can

work it, but it is worked easier by two men. We put the escapes on in the afternoon, and extract the next day, and we never have any trouble.

Q. Does the honey extract as well the next day?

A.—You must remember that we have very much warmer nights in Illinois than you have here.

Q. Do you use wire escape boards?

A.—No, we use the ordinary escape board, in fact it serves also for a feeder-board. Our extractors are very compact, they hold eight of our extracting combs, and the man who turns the extractor takes care of the honey and the combs; it keeps one man busy uncapping. We might find less fatigue in using a power extractor, but the noise of these machines annoys me greatly. In our out-apiary we have a small house to hold the extracting combs. We extract the honey at each house, the truck takes over the barrels and capping can. We used to stay over night at a place some distance from home, but with the advent of the auto there is no need to stay anywhere at night.

Q. Supposing you had a buckwheat flow, could you get your crop off early enough, doing it in the way you describe?

A. We have no buckwheat flow, but we have a flow that is equal to it. We have a flow from the 15th August to the 5th September. That crop is usually very thick, the honey ripens very readily, and we do not have to wait long to extract it. We like to take the crop off before the entire flow is over. We take the supers from two or three hives, and just as soon we take them to the honey house we return them to the hive, and when the day's work is done we are through. When the cold weather comes we remove these, and put them away in the honey house, that is usually in October.

Q. Do you mean you put them back for the bees to clean out?

A. Yes, in every case. We like our combs to be repaired for the next season and the bees repair them.

Q.—Do you find any trouble in the bees taking the honey down to the bottom of the hive?

A.—I would rather have it stored there than have things sticky with it.

Q.—If you put these combs away in the winter partly filled, is not the honey likely to be granulated in the spring?

A.—We have so little of it that it is not worth considering. If you give them two or three inches of room between the body of the hive and the super they will remove it. I think that is an important point.

Mr. Harkness: I remove one or two combs from each super and spread them out, and then I take the bee-escape out of my escape board. I have no trouble whatever in the bees cleaning out the comb.

Mr. Dadant: If the crop is not quite ended, the bees will put more honey in these supers, and it is an easy matter to extract that honey.

Mr. Burk: I consider the wire escape board the only good one that has ever been invented. The bees will go out of this in most cases in two hours.

Mr. Dadant: I think you will find that when the escapes are in the corner, the bees will go around and be sure to find them, when the escape is in the middle I do not think it is nearly as good. When we put the escapes on between three and five in the afternoon, there are no bees to speak of the next forenoon. We do not make our increase from the best colonies, they are the colonies from which we expect the most honey. We raise our queens from the best colonies. When we come to divide, we do it from colonies that are not weak, but that have raised

their bees too late to be of much use in the production of honey. You all know that some colonies get behind time. It takes twenty-one days for a worker bee to hatch, and fourteen days more before they begin active work. Thirty-five days between the time the queen lays the egg, and the time they are fit for work. If you have a queen who does not begin laying until the beginning of the honey crop, then you have these late bees. These are the colonies from which we make our increase. They have no supers, but they have plenty of bees late in the season. We take the queen and two or three combs from the colony, leaving her in the new hive on the old stand, and remove the hive with all the brood combs to the stand of another colony, which we remove to a new place, and in that queenless colony we introduce a new queen. We make one division out of two colonies, and within a short time all colonies are about as strong as they were formerly. The colony with the queen and two combs goes to the old bees. The colony which is queenless gets bees of another hive, and the young queen and has only two or three combs to replace, and if you give them foundation it takes but a short time to replace it. The colony you have removed to another spot, loses only its field bees. That system make a strong and valuable increase. If the honey crop is good, it won't take long for the bees to become accustomed to the new queen. If you take a strong honey producing colony away from a stand you delay it several days. It does not pay to weaken your strongest colony. I do not know how that would work in Ontario where you have but one honey crop.

SOME INVESTIGATIONS OF THE HONEY FLORA IN ONTARIO.

F. W. L. Sladen, Apiarist, Dominion Experimental Farms.

It is convenient for the purpose of studying honey production in Canada to consider three principal regions. 1. The Eastern, extending from the Atlantic coast to Eastern Manitoba; 2. The Middle West, extending from Western Manitoba across the prairie, and including the dry belt of British Columbia; 3. The Pacific Coast, typified by the lower mainland. These regions grade into one another and can be subdivided into a number of more or less definite areas.

The Eastern region, extending from the Atlantic coast to Eastern Manitoba, has usually sufficient rain, heat and air humidity to make it a good beekeeping country, and nearly all those who make beekeeping their principal or sole occupation are located in this region. The principal crops of honey are three: 1. Clover, alsike and white, extending from mid-June to mid-July or the end of July. 2. Fireweed, from early July to the end of August. 3. Golden-rods and asters from early or mid-August to mid-September. Locally in Southern Ontario and Southwestern Quebec there is basswood during clover bloom, and buckwheat in August. It must not be supposed that the whole of this vast region is a good beekeeping country. The greater part of it is thickly wooded, and there are large rocky areas where very little honey can be obtained.

Alsike and white clover are found principally in the farming country, and seem to reach their best in Ontario south of the Ottawa River. The lake region here steadies the temperature and maintains humidity. At the same time, this being a southern interior section, heat and fine weather seldom fail, and an average annual clover honey crop of about 100 pounds of extracted honey per colony, spring count, may be expected in the better districts where the management is good.

Fireweed is found in the partly cleared lands that are not yet in cultivation, especially in rich, moist places where timber is decaying, in places recently devastated by fire and in the clay belt of Northern Ontario. It needs fine, warm weather to secrete well. It is more valuable than clover in the northern part of the Gatineau Valley, and probably at least of equal value, in the New Ontario clay belt between North Bay and Cochrane, and in the swamp lands around and to the east of Molson, Man. Its merits lie in its long season of yield, lasting from early July to the end of August, this being the best part of the season, commencing two or three weeks later than clover so that the bees have plenty of time to build up; and in the white color and mild flavor of the honey. Averages of about 100 pounds per colony, spring count, appear to have been obtained from this plant during the past seven years in a large apiary at Montcerf, Que., in the Upper Gatineau Valley.

Investigations made in certain sandy and wet lands in the Upper Gatineau Valley and in Eastern Manitoba, indicate that an average of from 50 to 80 pounds of honey per colony can probably be got from them in places where the best species abound. There must be many places in Northern Ontario between these two regions where similar results can be obtained. The honey is usually of good quality and varies in different districts from white to golden. The honey gathered in swampy districts is usually bright golden. The wax is yellow even when the honey is white. The flavor is more or less pronounced, but sometimes very fine.

For Ontario, we may recognize three types of locations for golden-rod and aster which, however, often overlap.

1. Open swamp or bog. The principal plants here are *Solidago uliginosa,* a tall golden-rod with cylindrical inflorescence; *S. rugosa,* a species with spreading inflorescence; *Aster umbellatus,* a tall white-flowered species with a large flat inflorescence, and *Aster puniceus,* a tall and handsome species with hairy stem, clasping leaves and large blue flowers. *S. uliginosa* and *Aster umbellatus* commence to flower early in August. *S. rugosa* and *Aster puniceus* remain in bloom until mid-September, so there is a month or five weeks of possible honey flow. The swamp or bog type of location is largely independent of rain during the honey flow, but needs fine weather and moderate warmth.

2. Sandy or gravelly barrens or plains. Locations in which blueberry is frequently abundant. Here we get *Solidago puberula,* and the highly productive *S. squarrosa,* and also asters of the *cordifolius* group. The honey from these species is gathered very late, during the last week in August and first two weeks in September. Good rains in early August followed by fine and moderately warm weather during the flow are needed to get the best results. The color of the honey produced in a location of this kind at an out-apiary that I tried at Kazubazua, Que., is nearly white and of a very pleasant flavor.

The common golden-rods of the roadsides and waste places in the farming lands of Old Ontario are not heavy producers of honey under ordinary conditions.

Golden-rods and asters come into flower earlier in the north than in the south and on the coast.

It is possible to find locations where all these three principal sources of honey —clover, fireweed and golden-rod and aster—abound. Such locations have from ten to twelve weeks of possible honey flow, and should be ideal for honey production. It seems probable that, taking one year with another, selected places in these regions of successive honey plants may produce larger crops than the districts where the white honey flow is confined to clover and lasts only three or four weeks. In order to find out the value of these and other promising regions, I am starting

co-operative experiments with enlightened beekeepers located in them, a colony of ascertained strength being kept on scales and the gain or loss in weight every day during the season being noted, together with the daily weather and much of the regular information supplied in the reports that we make of the apiary at the Central Experimental Farm, Ottawa, and those of the branch farms, such as notes on the honey plants and the yield per colony, spring count. Two such co-operative experiments have been carried on this year in the north country—one at Thornloe near New Liskeard, by Mr. William Agar, who reports an average of 233 pounds honey crop per colony, spring count, and the other at a large apiary at Montcerf, Que., in the Upper Gatineau Valley, by Mr. Jos. Martineau, with an out-apiary at Lytton, six miles further north in a moister spot. The average yield for Montcerf this year was only about 65 pounds per colony, spring count, on account of the failure of the fireweed, but the average for the past seven years has been about 132 pounds, mainly from fireweed. In the best year, 1914, the average yield was 263 pounds per colony. In the poorest year, 1912, the average was 42 pounds per colony.

The average at Ottawa in 1916 was 228½ pounds per colony, spring count, the highest on record, and the average for the past four years has been 98.2 pounds per colony, the lowest being 46 pounds in 1913 and 1914.

I have here charts showing the daily weather and gain and loss of a hive on scales last summer at these three places, and also at Ottawa.

(Mr. Sladen pointed out several interesting features in these charts, including a gain of 9½ pounds from dandelion at Ottawa on May 29th. The honey flow at Lytton in the north country commenced August 14th and continued until August 23rd, reaching its height on August 19th, with a gain of 18 pounds for the day. In answer to a question, Mr. Sladen said that he thought that this flow must have come mainly from golden-rod and aster.)

These three places represent large areas which as yet contain very few beekeepers. To get definite results the experiments must be carried on for a number of years to reduce to an average the great variations in crop from season to season caused principally by variations in weather. It is hoped that these experiments will also give us detailed information about the secretion of nectar of the principal honey plants under the different conditions.

THE PRODUCTION OF BEESWAX AND SOME OF ITS USES.

W. A. Chrysler, Chatham, Ont.

The use of beeswax is necessary to good beekeeping. Its use to beekeepers is in the form of comb foundation. Were it not necessary to have good worker combs, built straight in frames, and that worker comb would be built by the bees instead of an abnormal quantity of drone comb, there would be a limited quantity of comb foundation required for the beekeeper.

There has been no other substance yet discovered that will stand as high a temperature and not melt down, that can be shaped to its proper form by the honey-bee as their own wax.

The production of wax by many beekeepers has been neglected. Where beekeepers buy comb foundation without an endeavor to produce a like amount, or more of wax, than they have made use of in comb foundation, they are sustaining

a loss, not only to themselves but are fostering a foreign trade in importing wax for making foundation, and for other industries that find pure beeswax an indispensable substance in the manufacture of various articles of commerce.

The various uses of beeswax are many, to describe them all would be interesting, as I am unable to enumerate and describe them, I will have to pass that by. What the volume of trade in beeswax imported into this country is, I am also unable to state, but I am impressed with a feeling that we, as beekeepers, should bend greater efforts to save and collect a valuable product that is in many cases being wasted.

When beekeepers have colonies die in the winter, or early spring, the combs should be immediately cared for as the moths are likely to take possession and destroy the combs and most of the wax. Placing the hive bodies on end in the open air out of doors to permit a free circulation of air through the combs will prevent the moths from doing any damage. I have found that fumigation by sulphur, or formalin gas is successful if done several times, when the moth is in the larvæ state. If done before the eggs hatch or when the larvæ is in the cocoon it has no effect on the eggs, and but little effect when in the cocoon state. Broken pieces of comb should be saved, placed in a box, pounded down as solid as possible when warm enough so they will mass together and keep them dry; moths will not interfere with them in that state. In making examinations of the bees during the season, it is advisable to scrape and clean off all burr combs, and propolis (some propolis contains wax) from the frames and other parts of the hive. A handy hive tool suitable for the work should be used. After a little practice it will be found that collecting small portions of wax can be done at the same time of the examination of the bees, without materially hindering the work. These burr combs and scrapings are squeezed into balls and may be laid on the hive covers until the day's work is over, when they may be collected and placed in a box provided for them.

Many days I collect in this way the price in wax of a day laborer for a day's work. After the busy season is over I collect all the broken and imperfect combs together, and also the burr combs and scrapings, melt them up together and put them through a wax press.

The wax presses that are now made leave little to be desired in obtaining all but a very small portion out of old combs. Old combs to produce nice yellow wax should be kept dry until a few days before they are melted and pressed, when it is advisable to place them in water to soak up the cocoons and foreign substances.

In the production of extracted honey the surplus combs should be spaced wide enough apart for the uncapping knife to cut deeper than the capping, and thus obtain more surplus wax. This extra wax is obtained at no loss to the colony as much wax is wasted during the season by the bees by their being unable to use it in building comb.

The cappings from extracting combs we melt over a steam coil of pipe, and as soon as melted pass into a separator, which separates the honey from the wax. Beeswax can be injured by long continued heat and remelting several times. Every time wax is melted and cooled it loses some of its weight and texture, and what was nice yellow wax will become dark, harder, and less pliable for bees to work on, when used in foundation. It is advisable, therefore, when melting wax or combs they should not be left to boil any length of time.

To refine a quantity of dirty wax it should be put in a large vessel with water and brought to a boil, after every particle of wax has been melted, after which it should be removed from the fire or steam pipe and wrapped up in any way to keep it warm as long as possible to allow sediment and impurities to settle. Just before

it starts to harden it should be dipped out into dishes (earthen or graniteware is preferable). Wax when put in any receptacle at a low temperature will not adhere to it, and is always readily removed when cold.

Sun wax extractors should not be used in any case, as they require more labor and too much attention, outside of the fact that the wax produced from them is somewhat inferior to that melted in water at less expense. Wax melted in metal receptacles is inclined to darken the wax, and more so when cooled in them.

Q.—I would like Mr. Chrysler to explain his steam pipe?

A.—We delight in making things for ourselves. We have one coil of three-quarter inch pipe. It occupies two foot square and sets in a pan one foot deep and there is two or three inches of space left below the pipe in order to clean out the slum gum.

MR. PETTIT: Do you use that while you are extracting?

A.—We do not touch our capping until a long while after, we allow them to drain as long as they will drain.

Q.—How do you produce the steam?

A.—We made a steam boiler of our own, using a coil of pipes. It is cemented in, it does not hold more than a half dozen pails of water and it can be heated up in twenty minutes.

MR. MEYERS: I would like to know why you think that wax from steam heat is any better than wax from a solar extractor?

A.—The constant attention every day on a solar extractor gets on my nerves. I have in my mind a still further experiment in melting wax, but will not say anything about it at present.

MR. MEYERS: If the solar extractor is made right so that it will contain sufficient heat it gives perfect satisfaction.

A.—The great objection to the solar wax melter is that the heat is not constant, and the heating up and cooling of the wax carbonizes the wax.

THE CHAIRMAN: The great trouble I find with them is that they get too hot.

A.—Wax and honey as it is melted should be kept away from the sunlight.

MR. DEADMAN: I have had sufficient experience with wax to satisfy me that what Mr. Meyers says is right. From every thousand pounds of honey extracted we get ten pounds of wax. I think the thanks of this association are especially due to Mr. Sibbald. Until I got hold of a Sibbald wax extractor I never could get good results. I felt that I got more extra wax than would pay for the press. With this Sibbald press we can turn out 250 lbs. of wax in a day. In all these wax extractors where the wax comes out from below you must have a warm room. With the Sibbald press, where the pressing is done under hot water, that is not necessary, and you can keep the place as cool as you like, as long as you have it warm enough to melt the wax. I think it is a good thing for the beekeepers to be able to get this press at the price it is now quoted at.

MR. MEYERS: I have a Sibbald wax press for melting my combs. I have tried a great many different capping melters, and I prefer the solar. I have it just outside the honey house.

MR. CHRYSLER: We must have the wax press for the old combs.

MR. EVANS: I have a solar extractor and a pressure extractor, and I have the D. A. Jones steam extractor. I do not expect to use the solar any more because it does not make good wax, and I cannot prevent it from darkening the honey. I think the great trouble with the old Gemmel press was that the operators did not put on sufficient pressure.

MR. DUNN: A great many of the solar wax extractors I have seen are leaky,

and in case there is any disease in the neighborhood we should not use the solar extractor because it is very dangerous.

MR. BISBEE: If you use an iron kettle you will find the wax will be darkened. Wax that is cooled quickly will be hard and brittle. If you give the wax plenty of time to cool it will be nice and soft.

MR. HERSCHISER: We all know that the cider mill men make water cider. They put on as much pressure as it is possible to get on the mill and yet out of the pumice they can get water cider, and the reason they can get that water cider is that they expel by capillary action what it is impossible to expel by pressure. And that is the reason why there is a little honey left in the capping press. The same is true of the slum gum. You leave quite an amount of wax in the slum gum, and it is possible to expel that by the right kind of process.

I have not used a solar wax extractor for years for the simple reason that I find no advantage in using it. I have to press out the slum gum at any rate and while I am doing that I might just as well press it all out. There is always more or less slum gum in the capping, and I make a cheese of that, and when I get several of them I make a separate pressing of them.

There is just one point about a wax press that a good many people allow to escape their attention. Because they can see no wax in their slum gum they assume that they have it all out. I never saw any slum gum that would not make fuel, I burn it in my grate at home, it is simply the foreign matter that makes the fire, it is not the wax at all. If it is not thoroughly dry it won't burn. The trouble with any wax press where you cannot repeat the pressure under water is that the longer you press it the harder the outside surface becomes, and the harder it is to expel the wax. By having a water boiler you can make the pressure and get out all the wax. If you allow the pressure to relax it will soak up more water, and then when you again apply the press the wax will escape. I had one good sized specimen of slum gum tested and the report made on it was that five-eighths of one per cent. of its weight was wax.

MR. DEADMAN: Have you ever tested any slum gum from the Sibbald extractor.

MR. HERSCHISER: No, I have not. I think haste is one of the things you should avoid in extracting wax. If you do the work clean and get a reasonable amount of wax out each day, then your work is well done. I want to say here about Mr. Chrysler's statement that propolis does not contain any wax. In my experiments in melting up old comb and slum gum I have had occasion to produce propolis in large quantities. You cannot get propolis so clean but that there will be from 8 per cent. to 10 per cent. wax in it. When it is heated it is something like taffy, it holds on very tight. It is a rather unsatisfactory material to work with, yet there certainly is some wax in it.

MR. EVANS: In melting old combs did you get more than two pounds of beeswax to one pound of foundation put in?

A.—I should estimate that I got at least that. It only takes about one pound of foundation to fill eight frames, and you can easily get from two to two and a half pounds from an eight-frame hive.

MR. CHRYSLER: You made the statement that I said there was no beeswax in propolis, the statement I made was that there was beeswax in propolis.

MR. DADANT: I can see very readily that in running beeswax if you use water containing iron you will get a dark wax, and there is no method, except the use of acid that will lighten the wax. The great thing is to render the beeswax properly. We used five solar extractors at one time; we do not use any now. The

solar extractor gives quite an amount of labor for the wax you get out of them. It makes very fine wax. It bleaches the wax and makes it a very light color. We look for economy in the production of honey, and we try to save every drop of it, and we want it of a light color, and you cannot have it a light color if you allow it to melt with the wax. Instruments for draining are not expensive. You can drain your capping so that there will be very little honey left, and although it takes time it will pay to do it. The beekeeper who harvests ten thousand pounds of honey can make vinegar out of the stuff that you allow to run away with your wax. We wash our cappings before we render them and after we render them there is no honey in them. There is a little slum gum, but that is rendered afterwards. I am a wine maker. I was born in France, in Champagne, and I know that you can press as hard as you please with a press, but you will always leave some pomace with juice in it after the first pressing, and if you press again you will get more juice. It is exactly the same with wax. If you press without heat you will never get it all out.

Now I want to take exception to one statement that has been made, that from one pound of foundation you get two pounds of wax. It depends on how long the combs have been with the bees, and how much slum gum there is in it. If your combs have been a long time with the bees, each year they strengthen them. We may get more or less than twice as much.

MR. EVANS: I do not think any beekeeper would think of immediately melting his combs.

A MEMBER: Is there any way of purifying wax that has become adulterated?

MR. DADANT: Not that I know of.

W. D. ACHORD, Fitzpatrick, Ala.: I ship a great many bees, and they are all supplied with sufficient food for the journey, and they all get through. I do not have any losses where the bees are delivered in eight days. The only trouble I have is where they are held in transit more than eight days. Some time ago we did have trouble because we were not putting in sufficient food.

MR. HERSCHISER: How many dead bees could there be in a package, and it be considered a successful shipment?

MR. ACHORD: I do not know. I leave that with the buyer. If he is not satisfied I make good. I take the bees as I find them in the afternoon, soon after the middle of the day, when most of the old bees are out. Occasionally I get in some drones, and sometimes I do not have any in the package.

MR. HERSCHISER: I received a package last summer and I found that 25 per cent. of the bees were drones. I received another package in which seven-eighths of the bees were dead. Would you consider that a successful shipment?

MR. ACHORD: Not at all.

Q.—Is there any reason why there should be any drones?

MR. ACHORD: It would be expecting too much to get bees without drones. The drones are considered to stay in the hive and produce heat. At the time of the year when the honey season is not on it is a question whether or not the drones do not do as much good as the worker, in keeping up the temperature.

Q.—Do you consider water necessary in shipping?

A.—I contend not, I never use it; I know it is a question.

Q.—Do you consider it at all necessary at any time?

A.—Not with a swarm of bees, generally speaking the bees use water to feed the larvæ, there is no larvæ there.

Q.—If they drink a good deal of water when you receive them is not that a sign that they are pretty dry?

A.—I do not know how dry they would be. They come from a dry state.

THE CHAIRMAN: A beekeeper who had received eight packages of bees telephoned for me to come over as the bees were roaring so much he did not know what to do with them. I told him to give them water, and just as soon as he did so they quit.

MR. DADANT: Don't you think the sugar was too dry?

MR. ACHORD: That is quite likely.

MR. CHRYSLER: Don't they get a certain amount of moisture from the atmosphere?

MR. ACHORD: Certainly. If it is a queenless swarm it will roar.

Q.—What is your opinion as to the likelihood of spreading foul-brood.

A.—I do not think there is any likelihood at all, the postal regulations are very strict.

Q.—How should the queen be put in?

A.—Where the queen comes with the bees I advise feeding them. You must be careful not to let them take wing. Occasionally I put the queen in the cage and tack it right on top so that they come in contact with her. You can take the queen cage and put it between the combs in your hive.

Q.—I know a party who received three pound packages from the States, and he put the cage in an empty super on the top of his frame and did not pay any more attention to them, and they filled that cage with honey.

MR. ACHORD: I always advise a purchaser of bees to put the queen in the way he thinks best.

A MEMBER: I just take a knife and cut the screen, and then I put four or five empty combs in the hive, and let the bees come out next the comb, and there is no danger of their flying out.

MR. ACHORD: The practical beeman would keep them in the hive.

THE CHAIRMAN: If you put them on in the evening there is no danger they will come out in the morning and go right to work. I would prefer to have the queen loose right in among the bees.

MR. ACHORD: I put the queen in her cage with the candy exposed so that the bees can release her.

MR. MEYERS: Is there any danger of carrying European foul-brood in that way.

MR. ACHORD: I have never had a case of any kind of foul-brood and have never seen one case; I am not an authority on foul-brood.

E. R. ROOT, Medina, Ohio: In the majority of cases water does more harm than good, because I do not know how water can be given to bees without giving them too much. The water leaks out of the containers and then there is trouble. Mr. Achord is the most successful shipper of bees for long distances. He uses a case in proportion to the package of bees. He sent some bees to me. I sent them to Washington, and then they were returned. They were on the road twenty-seven days. That is some record. I believe the pound package of bees is going to solve the problem of getting bees from one part of the country to the other without carrying disease.

REPORT OF THE SECRETARY FOR 1916.

MORLEY PETTIT, GUELPH.

The total number of memberships in the Ontario Beekeepers' Association received during the year ending November 30th, 1916, is 1,016. Four hundred and nineteen of these memberships came in from affiliated societies, and the balance of 597 by single subscriptions. There have been two new county associations formed during the past year, namely:—Nipissing and Renfrew, and four associations, namely: Elgin, Glengarry, Lennox and Addington, and Northumberland, have dropped out, making the number of affiliated societies, twenty-four.

The following is a list of the affiliated societies with their members:—

	Members.		Members.
Brant	8	Nipissing	11
Carleton	20	Norfolk	13
Essex	9	Oxford	25
Grey	15	Prince Edward	14
Haldimand	4	Renfrew	14
Halton and Peel	19	Russell	14
Huron	17	Simcoe	11
Kent	16	Stormont	13
Lambton	22	Victoria	22
Leeds and Grenville	14	Wellington	32
Lincoln and Welland	26	Toronto	31
Middlesex	39	York	10

During the year the grants to affiliated societies have been on a per-member basis. This has had the effect of stimulating the stronger societies, and we find that ten of these have increased their membership. On the other hand, three of the newer and one of the older ones have dropped out. The total number of memberships received through affiliated societies is slightly reduced.

The queen order business was continued during the year. One hundred and seventy-seven members purchased 1,022 queens at an average of 73 cents each. Two hundred and forty-three orders were filled in all.

The Treasurer's Report was also read and adopted. (See p. 4.)

REPORT ON CANADIAN NATIONAL EXHIBITION, TORONTO.

J. D. EVANS, ISLINGTON.

We had about the same experience this year as last. We are never treated well by the Directors of Toronto Exhibition. This year the matter was left to Mr. Rogers and myself, and I thought everything was satisfactory, and that we would not be charged; but the first thing I knew they had in the catalogue that those exhibiting had to apply for a license to sell. I asked Dr. Orr what it meant, and he said he did not know what the charge would be until they knew how many would exhibit. I think the only thing to do next year will be to insist upon our directors meeting the directors of the exhibition. One prize in the flower department is as much as all the prizes in the honey department. I think the beekeepers should refuse to exhibit until things are made more satisfactory.

THE CHAIRMAN: I think Mr. Evans is right, and that we should refuse to exhibit until they decide to give us better treatment.

MR. COUSE: We could not stop anyone from exhibiting if they decided to do so. I say keep on, and we may get something better.

MR. EVANS: I arranged that we could sell, but they would not state the amount they would charge.

MR. GEO. LANG, Milton: I did not pay anything. I just went to the show, made an exhibit, and sold my honey every day.

THE CHAIRMAN: It is up to the rest of the beekeepers to do the same thing.

REPORT ON OTTAWA EXHIBITION.

M. B. HOLMES, ATHENS.

I have not the same kind of a story to bring from Ottawa. I endeavored to impress upon the directors that he who sits upon a colony of bees will live to rise again. I told them I could give them two or three pointers along that line. I did not antagonize them, but told them of several improvements that could be made, such as making the exhibit a little more attractive and the prize list larger. I used a little diplomacy, with the result that the management were responsive and willing to accede to my request. We had a number of exhibitors, and everything was very satisfactory, and I feel sure that whoever your representative is this year he will receive a proper consideration.

REPORT ON WESTERN FAIR, LONDON.

E. T. BAINARD, LAMBETH.

We had the same trouble as Toronto, but in a different way. Our trouble is to get exhibitors. We have only one good exhibitor. We have prizes for those who are exhibiting for the first time. We are going to make a special effort next year and hope to have a real good exhibit.

REPORT ON HORTICULTURAL EXHIBITION.

WM. COUSE, STREETSVILLE.

On account of the war we have not been able to hold an exhibition. We had about $1,200 in the treasury. Part of that was given to the Patriotic Fund, but we have sufficient to start up the exhibition again as soon as things become normal.

REPORT OF THE HONEY CROP COMMITTEE.

GUELPH, CANADA, AUGUST 13TH, 1916.

The Crop Report Committee of the Ontario Beekeepers' Association met on Thursday, August 10th. Nearly five hundred beekeepers from all parts of the province reported their crops to average about ninety pounds per colony. The quality of the honey is excellent, light in color, heavy body and a good flavor. Although the crop is large it should find ready sale at the prices recommended last year. The market has been practically bare of honey for several months. Fruit is less than half a crop and is high priced. Sugar is dear and canning will be reduced accordingly. Honey at a reasonable price will be bought in large quantities by housekeepers.

Dealers naturally expect to buy cheaply and members are advised to sell as much as possible at home at good retail prices, and distribute the selling over the year, remembering that if the present dry weather continues there may be no crop in 1917, and honey may profitably be held over. Local selling can be greatly increased by judicious advertising.

The prices recommended are as as follows:

No. 1 light extracted, wholesale, 10c. to 11½c. per lb.
No. 1 light extracted, retail, 12½c. to 15c. per lb.
No. 1 comb, wholesale, $2.00 to $2.75 per dozen.
No. 2 comb, wholesale, $1.50 to $2.00 per dozen.

These prices are f.o.b. in 60-lb., 10-lb., and 5-lb. tins, the former being net weight with the tin thrown in, the latter being gross weight as the difference in time and trouble in filling the smaller tins about equalizes the price.

Beekeepers are cautioned not to extract from brood chambers. The continued dry weather has seriously cut off the nectar flow and the prospects of a fall flow. Taking too much from the bees may mean heavy loss from starvation.

Signed by the Committee:

WM. COUSE,
H. G. SIBBALD,
W. J. CRAIG,
MORLEY PETTIT, *Sec.-Treas.*

WHITE HONEY CROP REPORT.

Ontario Beekeepers' Association, Guelph, August 11th, 1916.

County	Reports	No. Colonies -Spring Count, 1915	Pounds* White Honey 1915	No. Colonies -Spring Count, 1916	Pounds* White Honey 1916	Average No. Pounds per Colony -Spring Count, 1916
Algoma	3	75	4,000	81	1,100	13.6
Brant	6	180	12,190	166	17,450	105.1
Bruce	17	814	31,120	852	85,210	100.0
Carleton	4	100	4,021	102	8,389	82.2
Dufferin	7	453	30,047	494	40,592	82.2
Dundas	3	143	8,500	142	7,800	54.9
Durham	5	298	7,170	351	14,240	40.6
Elgin	18	553	32,386	666	55,750	83 7
Essex	6	106	6,545	115	11,725	101.9
Frontenac	7	344	10,100	347	24,100	69.5
Glengarry	5	594	42,500	619	15,800	25.5
Grenville	.....	.....	.....	.....	.....	.....
Grey	20	739	39,846	964	76,400	79.2
Haldimand	10	565	28,390	645	56,060	86.9
Haliburton	.....	.....	.....	.....	.....	.....
Halton	8	906	72,175	941	105,400	112.0
Hastings	10	370	17,770	460	37,100	80.7
Huron	20	892	47,055	1,159	85,853	74.1
Kent	9	393	17,405	575	64,460	101.1
Lambton	17	787	49,956	911	81,272	89.2
Lanark	8	596	15,760	518	32,310	62.4
Leeds	11	391	6,442	364	29,450	80.9
Lennox	7	248	5,245	241	22,245	92.3
Lincoln	13	494	23,682	617	56,590	91.7
Manitoulin	1	40	2,600	40	2,500	62.5
Middlesex	34	2,425	118,945	2,602	262,812	101.0
Muskoka	2	54	3,600	67	5,240	28.2
Nipissing	1	43	7,200	55	2,100	38.2
Norfolk	4	104	1,380	100	3,925	39.3
Northumberland	11	548	29,054	653	67,224	103.0
Ontario	13	579	35,777	619	57,795	93.4
Oxford	19	350	29,188	598	52,216	70.5
Parry Sound	2	179	5,700	197	12,700	64.5
Peel	15	916	70,835	959	114,000	118.9
Perth	18	119	53,822	671	68,455	102.0
Peterborough	8	82	3,692	82	7,850	95.7
Prescott	3	331	36,300	323	39,900	123.6
Prince Edward	10	292	1,600	419	25,770	61.5
Rainy River	.....	.....	.....	.....	.....	.....
Renfrew	3	290	20,975	346	32,600	94.2
Russell	7	327	24,265	433	45,650	105.4
Simcoe	23	1,245	71,553	1,352	108,134	79.9
Stormont	1	95	6,000	108	3,000	22.8
Thunder Bay	.....	.....	.....	.....	.....	.....
Victoria	11	407	17,400	434	50,495	116.3
Waterloo	11	102	6,330	171	11,580	67.7
Welland	12	365	26,140	403	38,820	96.3
Wellington	15	414	18,628	458	31,595	68.9
Wentworth	10	165	8,580	192	15,980	83.5
York	29	889	74,002	1,151	138,220	120.9
Totals	477	20,402	1,175,871	23,763	2,127,903	89.6

Average number of pounds per colony, 1916—89.6

* A small percentage of the honey reported is sold in comb honey sections. As a colony managed for comb honey will produce abont half as much as one managed for extracted honey, the Committee has multiplied the number of pounds of comb by two before adding in with the extracted.

DARK HONEY CROP REPORT.

GUELPH, CANADA, SEPTEMBER 9TH, 1916.

The Crop Report Committee of the Ontario Beekeepers' Association met on Friday, Sept. 8th, to consider the crop of dark honey. It was found that 89 members had reported 91,325 lbs. from 5,091 colonies, being an average of 18 lbs. per colony. This is about the same as last year's average, but owing to high prices prevailing in all similar lines, the committee advises members to ask 8½ to 9 cents per lb., wholesale, depending on the size of the package and the quantity sold in one order. No buckwheat honey should be retailed for less than 10 cents per lb.

In issuing this report a year ago, the statement was made that the local demand for white honey was exceedingly good. The situation this year is if anything better than a year ago, and the very large crop of white honey is moving rapidly. Many of the members have sold out entirely at prices as good as, if not better, than those recommended by the committee. When it is remembered that nearly a year must go around before another crop is harvested, and weather conditions have not been the best for next year's clover, beekeepers need have no worry about selling their honey at good prices.

Of course, dealers have been able to secure a certain amount of cheap honey. It is always this way, and while the beekeepers who sold cheap are the losers, it is good for the honey trade that dealers are able to make an extra good profit on some of the honey they handle. The secretary frequently has enquiries for names of beekeepers having honey for sale, and while responsibility is not assumed, he is willing to put dealer and member in communication if so requested by any member.

Signed by Committee:

WM. COUSE,
H. G. SIBBALD,
W. J. CRAIG,
MORLEY PETTIT, *Sec.-Treas.*

H. G. SIBBALD: As you know, the reports showed a very large crop of honey. It was felt by some that the price might be raised, but the committee were in sympathy with the poor people who have to buy honey. It was also thought that if we raised the price foreign honey would be sure to be imported into the country. If you have taken the trouble to look up foreign markets, you will find that their prices are lower than ours. When we met in August, the report was that we would have a good crop of honey. The committee were unanimous in setting the price at the same figure as last year. We encouraged the beekeepers to be firm, and to expect a good demand for honey. I know that quite a number have sold below the price that we fixed.

I do not know of any class of people that have reason to be more thankful than the beekeepers, we have had an abundant crop. I think the beekeepers should consider it an important matter to send in their report as to the estimated crop.

MR. COUSE: Before the committee met I took the trouble to consult a number of wholesale dealers. They informed me that they would not offer the price I

asked, 11 cents; they said it would be better to fix the price at 8 cents. They said they could get honey in Quebec at 8 cents, and they actually bought it for that price. I haven't sold any honey below 11 cents.

A. E. HAINES: We are interested in beekeeping, but we are also interested in making money. We should endeavor to get the most we can out of our crop. I have realized a little better than 12 cents all around for my crop. What price did the crop committee get for their honey?

MR. SIBBALD: My honey would average me about 11½ cents. I haven't got it all sold yet.

MR. COUSE: I haven't received anything less than 11 cents, and I have received as high as 13 cents.

MR. BAINARD: Don't you think we should state whether it is to be sold to jobbers or wholesalers. Before that report came out, we had our honey sold at 12 cents, and when that report was published in the newspapers, we had considerable trouble.

THE CHAIRMAN: The jobber will buy five or ten tons and the grocer will only buy only 50 or 200 lbs.

A MEMBER: I think it is a good point to distinguish between the jobber and the wholesaler.

MR. CHRYSLER: I believe that some of the jobbers who get a list of the beekeepers take advantage of that fact. I got a circular letter from a jobber wanting a quotation on honey, and he said "I must not overlook the fact that there was a large quantity of honey left over from last year." I replied that he was not doing the fair thing in making such a statement when he knew it was not the fact. Nobody would hold over honey from last year who knew anything about the business. I considered it advisable to increase the price this year from five to ten per cent. One departmental store is selling honey at fifty per cent. over the price they pay for it.

MR. SIBBALD: The crop committee set the minimum price for Ontario. We are not able to judge of local conditions. You cannot expect people to get the same price all over. In some places they charge 15 cents retail right at the bee-yard. If you have a large crop you must take a little less for it.

MR. A. PEUSEY: We in our locality feel indebted to the crop committee, but we would feel more indebted if we got their report two weeks earlier. I sold this year to a wholesale dealer at 10¾. The wholesale men won't buy until they get the report.

MR. MORLEY PETTIT: Every year we have complaints about the crop report being too early or too late. You must remember that we are dealing with a very large territory. We cannot tell much about the crop until the last report is in. This year I telephoned Mr. Couse two or three times asking him, "When do you think we had better take the report."

THE CHAIRMAN: In 1913, the crop committee were criticized for having their report out too early, this year they are criticized for having it out too late. It is difficult to get it just right, and so that everybody will be satisfied.

QUESTION DRAWER.

Answered by J. D. Evans, Islington.

Q.—When is the best time to put foundation in the frames?

A.—I believe a good many people put it in the frames in the winter when they are not so busy, that is all right if you have a warm place. I do not bother with it until the summer, but if you have a warm place, it would be a good thing to handle it in the winter.

Q.—How long can worker comb be used for breeding?

A.—Some people say the cocoons decrease the size of the cell. I think it is always in good shape and can be used indefinitely.

Q.—Which is the best way to get increase—to buy bees in the South early in the spring or divide?

A.—I am very fond of yellow bees, and I make good increase by taking out the comb and building it up with nuclei.

Q.—What is the best plan to stop bees from robbing?

A.—I simply get some hay and pile it in front of the hive and then pour water on it, and make it thoroughly wet. It is pretty hard to stop bees from robbing unless you take them away. I sometimes put them in the cellar for two or three days.

Q.—How do you handle a strong colony to re-queen when its combs are not moveable?

The Chairman: It might be done by smoking and getting the queen on the excluder, and then run the other queen right in. If you had a laying queen, you could do it in that way.

Q.—How much honey should a colony have in the winter?

A.—I made my hives weigh 70 lbs. this fall. The hives with empty combs only weighed 17 lbs. One of my weaknesses has been that I have not given them enough, and sometimes they starve.

Q.—Are you speaking of a ten-frame hive?

A.—Yes, it is better to have some extra for the spring, they will eat it up.

Q.—How do you weigh your hives?

A.—I have a small platform scale. My man goes along and weighs them all, and marks the weight in pencil on the back of the hive. Then when we feed them up we weigh them all over again, we made sure this year that they had plenty of feed.

Q.—Is it necessary to clean a hive that has had foul brood before putting clean bees in it. Is foul brood in the combs or frames, or only in the honey?

A.—I pile the hives four or five stories high; I put a little coal oil in them, then I light a paper and put it in. You will find it smoking up five feet above the hives in a short time; I then put in some water and pop the lid on it and out it goes.

Q.—What is the best way to introduce a queen?

A.—When I am very anxious to introduce a queen, and I know there is danger, I go back to the old system of making a wire cloth queen cage. I take a piece of wire cloth, and make a little box about four inches square, and the edges deep enough to push into the honey. Then push the queen in with the colony of bees that come with the queen, the queen will be there alone on top of some fresh honey. In a few days, if they have not released the queen, loosen it up. I believe

the great trouble in introducing a queen is the antagonism of the bees that come with the queen.

THE CHAIRMAN: I think more queens are killed by the people being uneasy, and wanting to see what they are doing than anything else. I advise leaving them alone for a week. Very often if you look in the next day they will ball the queen and she will be dead in a short time.

MR. EVANS: I think the hole that is left in the cage for the queen to get out should be larger. If you are getting lots of honey you can almost introduce a queen at any time.

MR. DADANT: You must not put a queen in the cage and expect her to work downwards, she won't do it. Turn your cage with the mouth upwards and the queen will crawl out much more readily.

Q.—Of what use are combs filled with pollen in the spring. Please tell how to use them to the best advantage?

A.—I am strongly of the opinion that a comb filled with old pollen is never used. I suggested to Mr. Root that he should make an investigation to see whether the bees used this old pollen. I think the only thing to do with a comb of old pollen is to melt it.

MR. ROOT: I put these combs in the hive, and the bees clean them up. I consider these combs worth a dollar apiece. They use up every bit of the pollen.

MR. EVANS: Don't you think they throw some of it out?

MR. ROOT: They use it all up, as far as I can see.

MR. ARMSTRONG: There was hardly any of the combs that had not pollen in, and I came to the conclusion that they were exactly what I wanted to put my pounds of bees on. I put them in on that, and the pollen all disappeared, it was carried out. I am of the same opinion as Mr. Root.

MR. ROOT: Early in the season, I would rather have a comb of pollen than a comb of honey.

MR. EVANS: My experience has been that when there were combs of pollen, the pollen was still there in the fall.

MR. ROOT: You may have a great deal of pollen in your locality early in the season.

MR. EVANS: We have.

Q.—What is the cause of white foam on honey while liquefying?

A.—I do not know. I know every time you melt honey and warm it up, you are bound to have some white scum on it. I do not know what causes it.

MR. ROOT: The cause of the foam is due to the method of handling. If you use a pump, you should allow it to stand for quite a while. In bottling honey, if you pour it down you will have scum. The only way to prevent scum in bottling is to have a long spout that will reach to the bottom of the bottle, and let the honey come up. I think the foam is air bubbles that come to the top.

MR. HERSCHISER: I differ from Mr. Root entirely. I think the cause of foam on honey is due to atmospheric conditions, and the condition of the flowers when the bees are gathering the honey. Often we will have a crop of honey, and when you melt up a 60-lb. can that has been candied, there will be no scum, and other times there will be a large quantity of scum. I remember an instance when I had a crop of honey from asters late in the fall, and a 60-lb. can of honey had two inches of foam on the top of it.

MR. ROOT: It is either air or gas.

MR. DADANT: We have much to learn on this subject, my view is that these gentlemen are both right. There are all sorts of ferment germs in flowers. I think the best way is to test the honey, and if the foam is slightly acid, it is evidently fermentation.

MR. ACHORD: I think you will find that when you have honey that is subject to granulation you will have this trouble of foam. I take the position that there is always a certain percentage of fermentation before granulation. When the honey is hot you will often find that this foam contains very little fermentation. It is then strictly air bubbles; but when you see the foam on honey that is not heated, you know that it is honey that is subject to fermentation. Honey in which the percentage of fermentation is small will not granulate. You may heat that honey, and you will have no foam. Fermentation is what causes this foam, yet it does not mean that the honey is bad.

Q.—How many colonies do you advise for one yard in an average location?

A.—I suppose one hundred would be enough. I have one hundred and fifty. It depends on the location.

Q.—How do you get rid of the surplus honey in the capping?

A.—I press the honey out. I am satisfied with the facts, and I don't care a brass button about the theory.

Q.—What do you consider a good locality?

A.—If I had the choice of making a locality for myself, I would select one where there was plenty of fruit bloom, plenty of dandelions, alsike and basswood, and a buckwheat yield. I would have my yard facing south.

Q.—Do you prefer the candied clover honey to be of coarse or fine grain, and why?

A.—I do not think there is much difference so long as it is clover honey.

THE WINTERING OF BEES.

C. P. DADANT, HAMILTON, ILL.

We began wintering our bees in ordinary single walled hives. Then we tried the double walled hive and chaff hives. We did not like the chaff hive very much in hard winters, yet they are generally satisfactory, and they save honey. The point on which we had the most trouble was upper absorption. We have found to our loss that a tight sealed cover over the bees was injurious. Our loss happened in this way. We had probably 400 colonies and we had out apiaries. We used then, as we use still, an oilcloth over the combs. Some people call it enamel cloth, it is simply painted cloth. Most of you who have used that know that the bees tear that to pieces, and make holes in it. We usually replaced the damaged oil cloth before we wintered, but in the winter of 1885 we did not, we simply placed a warm material above, and it happened that the winter that we left them with holes in the oil cloth that they wintered better than ever before. Where the oil cloth was tight and no holes the moisture collected below the cloth and injured the bees, and where the oil cloth had holes in it the moisture went above and into the leaves, and the leaves were damp, but the bees were not affected by the moisture. That was a lesson we learned and now we are satisfied that the proper thing is to have absorbent material in the top of the hive. We also are satisfied that we must

leave some way for the moisture to escape into this material at the top of the hive. We have practised cellar wintering, but we live in a climate where we have too many warm days in the winter to make it desirable for the bees to be wintered in the cellar. If we knew beforehand that we would have six continuous weeks of winter weather we would probably put the bees in the cellar; but it is rare with us to have such a winter. Where the bees can have a fly once in every three weeks they do better out of doors than in the cellar.

When we wintered in the cellar we did it in this way. We had a space 20 ft. x 16 ft. in the cellar under our house. There is a furnace in the cellar and we made a wall between, lined with sawdust to keep the heat of the furnace away from the bees. We had plenty of ventilation. We took in from the apiary just the hive bodies. Each hive in the pile had its bottom on the hive below. Except the bottom hive of the pile, every other hive had its top and bottom taken off, and there was just a piece of oilcloth between. We put two cleats across the top of the lower hive, and then the next hive on top of that, and in that way we piled five or six hives one on top of the other, and we could put 200 of our large hives in a cellar that size.

Our experience as to whether the bees recognize the spot where they were hived the previous summer is different from that of Dr. Miller. I do know that in one instance at least bees recognized the spot of their last summer home. One summer we changed two or three of the hives from one side of the apiary to the other, and we said we would change them when the winter came. And in the spring after the bees had been put out my father said: "Here are some bees turning over the ground where there is no hive." When I looked into it I found that was the spot where their hive had been the previous summer, and we could see plainly that they were hunting for their old home. When you see bees drifting from one hive to another in the spring it is due to the fact that they have been placed in the wrong spot. It is not very difficult to mark your hives so that you can place them in exactly the same spot, especially if you leave the cover on the old stand.

For fifteen or sixteen years we have not wintered in the cellar. We have succeeded very well wintering them outside. I believe the studies of Dr. Phillips and his assistant are going to help us very much. I have suggested the trying of the experiment of wintering an exceedingly strong colony in comparison with a colony of ordinary strength and one of under strength. We believe that a good deal of the success we have is due to the strong colonies that we winter over. I remember one hive that was so powerful that if we went to it at any time in the winter, no matter how cold, and touched it the bees would come out of the entrance. That hive seemed to be overrunning with bees. It seemed to have bees from one end to the other, and I believe if we had all our colonies strong like that they would winter splendidly. Wintering them in the double case as you do in Ontario, there is little danger of losing them. I certainly want to hear of the method you practise here because I feel that I will get some information that will be of benefit to me.

MR. BISBEE: What is your average low temperature in Illinois?

A.—We sometimes have it 30 degrees below zero. Our average low temperature is probably 20 degrees below zero, but it does not last long. We rarely have continuous sleighing for more than three or four days. I remember only one winter out of fifty-three that we have had six weeks continuous sleighing.

MR. ARMSTRONG: How much packing did you have on the top of the hive when you lost these bees?

A.—We simply fill the cap with forest leaves, we still do that.

Q.—Just loose?

A.—Loose; we use straw matting over the combs and leaves over the top.

MR. BISBEE: Do you leave your hives on the summer stands?

A.—Yes, we pack them. We realize that the wind striking against the hive is a very bad thing. There is loss of heat if a strong wind strikes against the hive. We have our hives facing, as much as possible, south-east or south-west. We feel that it is necessary to have protection to the north, and our hives are all double walled at the back. Then on the inside, the west side, when the hive faces south, we have a dummy, or division board. If our colony does not fill the entire space of ten frames we move the dummy up and fill that space with leaves. We use poultry netting on which to spread the leaves, and we wrap this around the hive. I know that this method is subject to criticism, because in a storm these leaves wrapped around the hive will get wet and I think it would be better if we had the double walled hive, but it would be cumbersome.

Q.—How about bottom protection?

A.—When there is any room we force leaves under the bottom board, that is all. We believe in considerable bottom ventilation.

Q.—What would you consider an average winter loss?

A.—I don't think our loss amounts to over 4 or 5 per cent. There will always be some queenless colonies, some queens will die in the late summer or fall.

Q.—Do you find much difference in the condition of the colonies after the winter?

A.—Not frequently. There are times when the colonies have not sufficient stores. We are not so particular about supplying them with winter stores as you people are. We occasionally have honeydew. I have not heard that mentioned here. Honeydew is very unhealthy for bees to winter on. We have lost heavily when we have honeydew in the hives.

MR. ARMSTRONG: Do you find that it makes much difference in the honey crop the way your hives are faced?

A.—When the colony is strong there is very little difference. I once bought two apiaries facing north, and in both cases there was heavy loss during the winter. The great trouble is that when the sun shines the bees go out, and when they have to go to the north of the hive they get chilled trying to get in; but if they are facing south, just as soon as they light on the board the sun keeps them warm.

MR. ARMSTRONG: With us our bees do not fly for three or four months, and the hives being packed with heavy packing, the sun shining on them does not make so much difference. Spring dwindling has a considerable effect in this country.

MR. DADANT: Don't you think that if you packed your hives all around you could get on without allowing the bees to fly? There are times when the chaff hives winter well, but we have lost with the chaff hive, and that is why we adopted the single wall front.

MR. HERSCHISER: When the weather is bright the bees will be induced to go out, but they will remain in if the hives are facing the north.

MR. DADANT: It seems to me that it is a benefit for the bees to get out and have a fly, when the bees are kept in the cellar you will find dead bees on the floor. We probably would have a peck of bees on the floor out of 150 colonies. When we kept our bees in the cellar we tried to keep the temperature at a point where the bees would be quiet.

Q.—What was the thickness of your chaff hive?

A.—Two boards and about two inches of chaff between.

MR. DUNN: Have you sudden changes of temperature, rain and snow?

A.—Yes.

MR. DUNN: With us the temperature will fall 40 degrees in a day. We never know what the weather is going to be like. I am glad to know that your winters are somewhat similar to our own. I take a six colony case and put six colonies together, I put the weakest colony in the centre. I have found the double-walled hive the best. We use asbestos paper and one inch of cork chips. I consider cork the best insulator. Sawdust is not nearly as good as cork; it contains more moisture, the cork is absolutely dry.

MR. MEYERS: I have found that I have been able to winter my bees to better advantage since I have closed the tops. I make a board cover and put the packing on that. I have no opening in the cover. I bring my bees through without any loss. I give my bees plenty of stores. They begin to breed about February.

MR. DADANT: It is out of the question for us to feed sugar syrup. We have extreme heat and extreme cold.

MR. EVANS: I would not like our friend to go away with the impression that everybody in Canada winters outside. I winter my bees in the cellar. I have had sixty years experience in beekeeping, and I have decided that cellar wintering is the best. I want my hives absolutely air tight, except at the front. One of the abominations of the bee-supply man is the reversible bottom board. These projections at the front prevent a proper entrance. The entrance should be so that you can make it any size you like. I want the bottom board quite air tight. I want my cover air tight. I have adopted the division board feeder. I have the supply man make it so that it will hold thirteen pounds. You can leave the division board in the hive all winter. When you take them out in the spring leave them so that only one bee can get out at a time, and the bees will be warm.

I have only found one case where the bees knew the location they had been in the previous season. In one instance I found the bees around their old location. I put a hive of bees on that spot and that ended the matter. I can guarantee the wintering of every hive of bees that goes into my cellar in proper condition.

MR. KIMBALL: My father built a beehouse above ground. It had been an old milk house and it was converted into a beehouse. It has a foot and a half of sawdust for insulation. There would be frost inside that house if it were empty, but it is full of bees and is kept warm in that way. I always fill it to the door. I can raise the temperature to 60 degrees when it is below zero outside. I can reduce the temperature in a very short time by opening a large ventilator. Colonies of bees have been wintered in that house on from 7 to 8 pounds of stores from the middle of November till the 1st of April.

MR. SIBBALD: Mr. Dadant spoke of finding moisture in the upper chamber in the packing. Did he have any chance for ventilation under the cover and over the leaves.

MR. DADANT: No, not then.

MR. SIBBALD: I always provide an air space over the packing.

MR. DADANT: That is right. We didn't have it then but we have now.

MR. BURKHOLDER: For a number of years we have been hearing of the opposition of the Canadian National Exhibition authorities. It seems that there has only been one exhibitor, and interest has fallen off. We have representatives present from all over the Province, why cannot we have an exhibition of honey at our next annual convention? I would suggest that we have samples of honey from the north, east and west. Each sample could be labeled with the name of the county in which it was produced.

Somebody asked Mr. Evans how he weighed his hives, and I am going to tell you how I do it. I take a platform scale and fasten it to an express waggon. I go along at the back of the row and set the hive on the scales, and mark on the back the weight. In that way I can go over the whole yard in a very short time.

MR. COUSE: We had an exhibition of samples of honey from different parts of the Province of Ontario three years ago.

MR. ROOT: I doubt if there is any clover honey produced in the United States equal to the clover honey produced in the Province of Ontario. I think you have the soil conditions and the climatic conditions that enable you to produce a remarkably light colored, fine flavored clover honey. I received a sample from your past President, and it was a remarkable fine, smooth, even, article of honey. I have been keeping it in my house as a fine sample of Canadian honey, and I have asked some of my guests what they thought of it and they have all said, "It is good honey." I asked some of our judges for their opinion, and they said, "The only fault is that we don't get enough of it." I don't know where you can get good clover honey to-day.

MR. J. D. EVANS: I do not think there is much use bringing honey here for the purposes of an exhibition. We want the honey where other people can see it. A few years ago we had $600 for the purpose of the exhibition, and the committee gave us 2c. per pound for our honey over the regular price. I think we could put up an excellent exhibition at the National on the same basis. I think if they would cut out all the prizes, and give us a good space and a grant of money, we could put up a very attractive display.

MR. BURKHOLDER: We should try and have an exhibition of honey somewhere.

MR. DUNN: A friend of mine had one hundred acres of alsike clover, and it is on a limestone ridge, and I think honey from alsike clover grown on limestone soil is the best of all. Peaches have a different taste according to the place they are grown, and I think the soil has an effect on the honey yield and its taste.

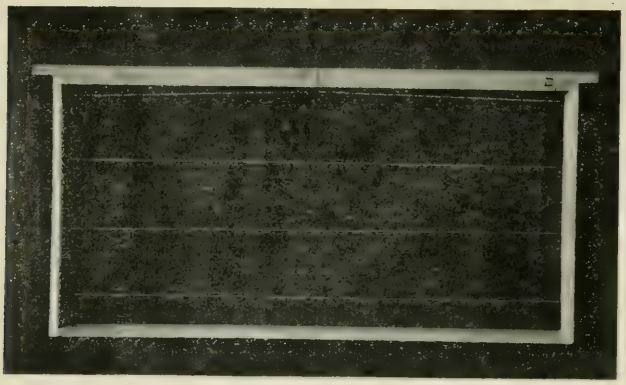
APPLIANCES ON EXHIBITION.

W. J. CRAIG, BRANTFORD.

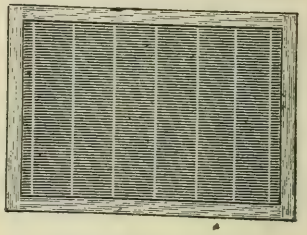
The great advantage in having a standard hive is that we can obtain supplies much easier than we could if things did not fit. There are other hives that are perhaps just as good as the Langstroth, they may be better in some particulars, but the Langstroth is the standard and it has a great advantage on that account. The old Langstroth frame had a top bar 7/8 in. wide and is still being used by some beekeepers. In the district where John Newton comes from they prefer the old Langstroth frame. Here we have the stapled frame, which is used at the Ontario Agricultural College. It is Mr. Pettit's pet. It has a 5/8 in. top bar without any groove or wedge. Mr. Pettit does not attach the foundation to the top bar, but it is held suspended by a wire. He assures me that the bees will attach it sufficiently and better than we could by a groove or anything else. The upper wire, which is only one-quarter inch below the top bar, is supported by a staple in the centre and that acts as an additional support to the sheet of foundation.

Here is something invented by Mr. Chrysler of Chatham, the idea is to encourage the raising of queen cells.

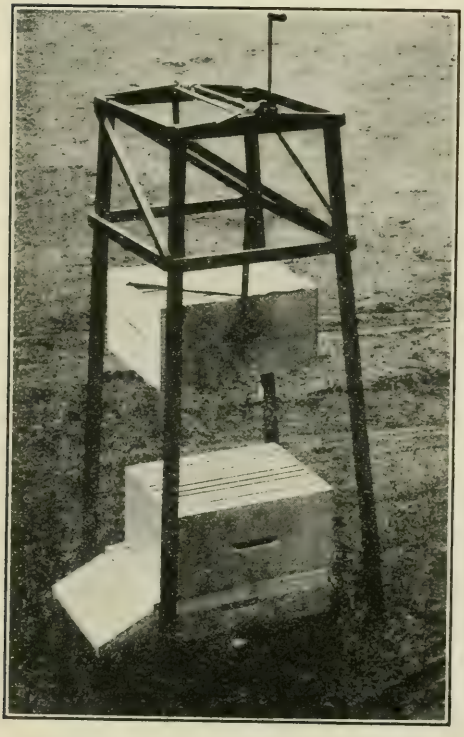
We have here a ventilated bee-escape board, which has been thoroughly tested and has great advantages over the common board. It admits of two bee-escapes,



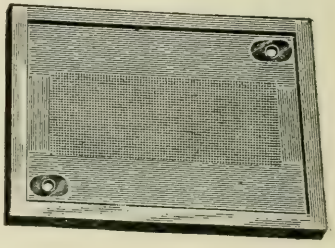
Pettit method of fastening foundation to the top bar . . . the bees do it.



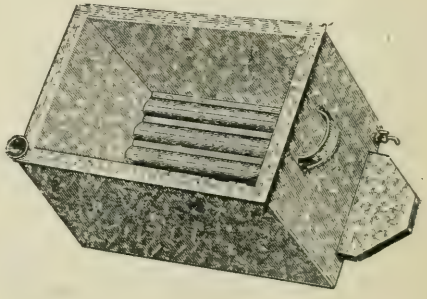
Wire queen excluder.



Super lifter used by E. T. Bainard.



Wood-wire bee escape board.



Cappings melter.

one at each corner. The argument is that the bees go around the board part and find the opening.

MR. ARMSTRONG: I put these bee-escapes on at about 11 o'clock and in an hour and a half the bees had all left the supers. They were working at that time, if the bees are not working the operation is slower.

MR. CRAIG: We have here an all wire queen-excluder. This has been used with satisfaction during the past season, and we have not had a complaint with regard to it. It is said that necessity is the mother of invention, and this excluder is largely due to the fact that we could not get zinc. The last quotation we had for zinc was 10c. a square foot and it takes two feet to make an eight-frame bee excluder.

Q.—Is not a wire excluder better than a zinc one?

A.—I believe it is. This wire excluder can be sold for 60c. for a ten-frame hive.

The last appliance I will show you is a capping melter. Mr. Armstrong is the inventor of this. I had the pleasure of seeing him operate it during the past summer, and it certainly did satisfactory work. This is a double tank, and inside are a series of tubes or pipes so that the water or steam passes through these pipes and increases the melting capacity. This can be set on a coal oil stove or a gas heater.

MR. ARMSTRONG: There is an inch space all around this vessel, and there is hot water all around. The wax will run out of the spout on this side, and the honey out of the spout on the other side. There is a division which comes within 3/8 in. of the bottom. Wax is lighter than honey and the honey goes to the bottom and comes out this spout, and the slum gum comes out there also. When you get through with the operation you can wash it out with the water that you have inside the tubes. If you leave slum gum and honey and wax to set over night there will be a difference in the color of it. The honey you get out of this is fit to put on the table. We sell it for one cent a pound less than the regular price. In running out cappings from 25,000 pounds of honey we had about 300 pounds of wax. We have a capping box 5½ feet long, 18 inches wide and 18 inches deep, and we keep the cappings draining as long as there is anything in them. After the season is over we melt that up. Anybody running seventy-five colonies of bees will save enough honey with this apparatus to pay for it in a short time. The whole thing complete is only $14.

THE DISTRICT REPRESENTATIVE AND HOW HE CAN HELP THE BEEKEEPER.

H. C. DUFF, B.S.A., MARKDALE.

There are over forty District Representatives in the Province at the present time, and their work is very largely educational. They assist in school fair work and hold courses in agricultural competition, in the growing of crops and so on. The District Representatives are specially trained for dealing with the problems of the general farmer, the dairyman, the fruit grower, and so on, but in connection with beekeeping, it is very questionable if many of them are specially trained to assist the beekeepers in dealing with their problems, particularly in connection with production. I do not think many of the District Representatives would

recognize foul brood at a glance, nor could give any of you any assistance as to how to treat foul brood in your apiary. That does not mean, however, that the District Representative cannot be of value to the beekeeper. The educational work that the District Representative carries on in connection with the general farm, and so on, cannot be applied in a similar manner to the beekeeper, and is not applied because you have your own inspectors working under your secretary who are more qualified to do that particular work. The District Representative does work with them to some extent in selecting a suitable place for a demonstration; and in suggesting places for the holding of the demonstrations he usually bases his suggestions on inquiries that come from individual beekeepers for information. Very frequently, the beekeepers drop in to see us in Grey County. Most of the beekeepers who visit us are just learning the business, and they ask for literature and all the information we can give them, and when we ask for demonstrations, we suggest that they be held near the men who are starting up in the business. We are not able to give these men very much that will assist them in learning the business, and nothing will assist them better than actual demonstration work. That is one thing that I thitk the Beekeepers' Association should encourage—more demonstration work with the idea particularly of assisting those who are in the business. Literature cannot assist them very much—even take that well-known book "The ABC and XYZ of Beekeeping." A person learning the business cannot get very much out of it. I can say from actual experience that you ought to be shown.

There is another way in which the District Representatives have assisted the beekeepers, and that is in connection with the organization of county associations. We organized one in Grey and it has been giving good results. I believe the value of these associations will be increased more later on. County associations are valuable from a social and educational, and to some extent, from a financial standpoint, because they enable the beekeepers to order certain of their supplies together.

That practically exhausts all the District Representatives have been doing for the beekeepers, but it does not exhaust the possibility of what they can do. I have asked a number of beekeepers what the District Representative can do to assist them, and most of them, with a little twinkle in the eye say, "Do as little as possible towards increasing the number of competitors." In some respects that is very good advice indeed. When we were connected with the business—we are not connected with it just at the present time—we thought it was excellent advice; but when we stop to think about it, it is very questionable if it is good advice. It is excellent advice in this respect. A man who has spent a great many years in building up a special trade in his own vicinity, if the competition were greatly increased, his special trade might be interfered with, and he might have some difficulty in getting rid of his surplus product. That is where an increase in competition might prove harmful to a few individuals. But the idea of restricting competition is to be looked upon as bad business, because the modern method is to encourage competition and encourage production. You see this illustrated in the Live Stock Associations. For instance, the Holstein and Ayrshire Associations have made great progress by encouraging competition and production, and they are getting wonderful results. Again, the manufacturing associations have increased competition and production, and they are having wonderful results. They are getting a greater demand for their products and better prices.

I would not say that there is over production of honey, but I would say that there is under distribution. I notice that by the President's address he remarked that honey is being very largely used, but the market is not fully developed by any

means, even in our own Province. That you all realize. The market for honey may be well developed in the immediate vicinity of an apiary, but outside of that, in the County of Grey, and I think I am safe in saying in many counties in the Province, there is comparatively little honey consumed. I know that in many farmhouses very little honey is used at all. You will find an occasional farmer who will buy a small supply. Four years ago our honey market was not developed, and to-day it is not developed; there is great room for work in that regard.

We believe that the District Representative is warranted in encouraging greater competition, but they are not doing very much in that particular line, in the first place, because they consider this should be started by the beekeepers themselves. Honey is a very important food product and should be better known, and the Beekeepers' Association should make use of the District Representative in advertising honey.

The other day we were breakfasting at one of our hotels at Markdale, a town where almost all of the stores have fairly large quantities of honey, and we asked for some. We were told that they did not have any, that is was too dear to buy this year. We did not have the information at the time to prove that that was not true, but still they had none in that hotel, and they are not likely to have any for some time.

You have had an excellent crop this year, possibly the best that you have ever produced, and you have produced a sufficient amount to meet the demand, but there is a possibility of the time coming when there will be over-production, and I firmly believe that now is the time to begin to prepare for that time. The District Representative can greatly assist in disseminating literature showing the benefit of honey as a food. If you advertise honey in a proper way, you are sure to increase the demand for it, and I am sure you can find other ways in which you can use the District Representatives.

REPORT OF THE RESOLUTIONS COMMITTEE.

PRESENTED BY M. B. HOLMES, ATHENS.

To the President and Members of the Ontario Beekeepers' Association in convention assembled:

We your Standing Committee on Resolutions beg leave to make the following report:

1. We note with sadness the inroads made by the hand of death among our very prominent men, and men of affairs namely: Hon. C. C. James, and Hon. J. S. Duff, and in the homes and families of our members, namely: George Ott, Arkona, Ontario; E. F. Robinson, Victoria, B.C.; Wm. Elliott, Adelaide, Ontario; F. A. Gemmell, London, Ontario; W. V. Bowen, Niagara Falls, Ontario, and a son of Chris. Quenbury, of Simcoe, Ontario. And whereas these several homes are thus darkened by the shadow of death, and they await in sorrow, longing for the "touch of the vanished hand and the sound of the voice that is still."

We, therefore, recommend that the sympathy and condolence of this Association be tendered these several families thus bereaved, and that a communication so indicating be sent to the various homes as stated.

The motion carried by a standing vote.

2. We have had before us a communication from the Kent Beekeepers' Association asking that steps be taken towards the adoption of a deeper frame than the Langstroth and the standardizing of the same and other lines of supplies. We recommend that this matter be referred to the Executive for their consideration. Carried.

3. We note that the action of the Executive in calling this Convention on dates in the month of December, as suggested by the Leeds and Grenville Beekeepers' Association, has given general satisfaction, as evidenced by the fine attendance at every session of this convention.

We, therefore, recommend the December date for the next ensuing Annual Convention of this Association.—Carried.

4. We note that the presence of American visitors has contributed in a very marked degree to the interest of this Convention. This has been true from both an intellectual and a social viewpoint.

We, therefore, recommend that the best thanks of this Association be tendered to them and each of them, and that an invitation be extended them to visit us on some future occasion. Carried.

THE USE OF SHALLOW HIVES IN CONJUNCTION WITH THOSE OF STANDARD SIZE.

G. A. Deadman, Brussels.

I am going to speak of the shallow hives and we mean a hive that is not as deep as the Langstroth. The hive itself is about six inches deep, and the shallow hive that we use is about five inches deep. The Langstroth frame 9⅛ inches deep is the standard size. The combined brood chamber I use is a little deeper than the Langstroth. The advantage of the shallow hive is that you can make anything you want. You heard yesterday the advantage of a large hive to prevent swarming, and with a shallow hive combination, you can get that same result.

The amount of honey bees will gather depends to a certain extent upon the hive you use. I have had bees that did not gather any honey because they took up too much honey raising bees. When I heard a man saying that he did not get the bees at the right time for the honey crop, it sounds like a man saying that his corn was not ready to hoe.

One of the great advantages of the shallow hive over the deep hive is that when you want to contract the queen, you can do it without any trouble.

The Jones frame is 12 inches wide and 15 inches high, and the Gallop frame is about 12 inches square, and it is supposed to be a good hive to winter in, but the objection I had to the Gallop hive was that the bees would crowd around in all the frames. We took the queen-excluder and put it on the Gallop hive and we were able to produce comb honey in the centre and extracted honey at the ends. Beginners get the idea that they want to see the queen about every day, but I got over that idea, because it is a wrong principle. The bees will not go to the end of the hive to store honey. They prefer to store it above because they know that is the place to keep their honey, and the first thing they do on the approach of cold weather is to bring the honey from the sides to the centre. I then cut my hives down the other way. If you have three of these frames one above the other the queen occupies the whole of them. The bees do not like to go over a lot of honey.

The large hive men say they cannot get their bees to work on sections, and the reason is that their hives are too large. Unless your bees winter well you won't get much honey the next year. The bees should be fed by the 1st of October, and we get to the apiary on the 1st of October and begin feeding them. We winter them in the shallow hives, and whether you put the shallow hives under or above depends upon the amount of honey in the shallow hives. Some people say, "Why don't you leave your bees enough honey for the winter?" But unless you have a fall flow you cannot do that. We never want to disturb the hives that we use in the winter and all the honey they bring in in the fall we leave in, and if they do not bring in enough we do not propose to feed back honey. We feed them on sugar syrup. All we have to do is to leave the super full of honey to feed the bees. Dandelion honey accumulates sometimes, and if we take a super of it away we put the other one below, and it may be half full of dandelion honey, but we never extract that. It is no use extracting poor honey and feeding clover honey for the winter, but dandelion honey is all right to feed to the bees. At one time I had an idea that empty combs at the top did not matter much, but I got a good lesson in that very severe winter when the bees kept working up until most of them got into these empty combs and died, and in the spring I had dead bees in the combs, and there was plenty of honey for them down below, but they had worked up to the empty combs. You must make sure that you have plenty of feed in the top and then the bees will winter well. I think the best place to have the empty combs is down below, and since we have adopted that plan we have no trouble in wintering our bees. We never lose a hive, but we sometimes lose a queen. I find with two hives wintered together, the colonies will come out strong. This fall I had a man to help me put them in the double hives, and one man could not lift one of the hives because there was too much honey in it, but when I use the deep hive in combination with the shallow, I find it easy to manage. The main thing to consider is the combination of the shallow hive with the deep hive, and if the shallow hive is empty put it below, but if it contains plenty of honey, put it above. You see you can work it both ways.

In the spring you do not require to touch them at all. If the shallow hive is below, we lift it up and you can leave it there all summer. We use these shallow hives for supers in the summer time. We put them on top, and put a queen excluder in between them. Of course if there is brood in them you will have to watch them. On the 10th of June we take those that are below and put them above, and then put the queen-excluder on. Before you put the hive above you want to make sure there is no queen there. We use a deep super in connection with those on top. A shallow super is better because they are easier to handle, and if the shallow super contains brood you can leave it there or set it on another stand, and there you will have something to make your increase.

Put a deep hive above all drawn combs and you have a hive for the next winter.

The reason why a great many beekeepers have no supers is because they have not time to make them up, and they have to leave them with one super. I have to get the extracting done before I leave there on August 15th, and I do not require more than two supers. I do not think you can get good honey by using one super only.

I like a shallow hive because there are some years when you would rather feed, and if you are going to be short of honey it will pay you to feed in the shallow hive. If I have a hive with a poor queen I put a red cross on the hive, and that means that the queen is to be killed. Supposing she is over age but a good

queen, I put a question mark, and that means that she is over age, but you won't kill her. When a colony swarms I put a hive behind, and I know that that hive is one that swarmed, and you know that the hive behind has to have a queen, and you do not want a queen from the same colony because they swarmed. If I have two shallow hives together I put another shallow hive on top of that full and strong, and I have known some men to winter on two shallows; one man told me he wintered on one shallow hive. I think you should have three shallow hives to winter and in the spring the bottom one will be empty.

Another advantage of the shallow hive is that you reduce the laying power of the queen. You should keep the queen from laying at the proper time, and you can do that if you have a shallow hive. A shallow hive is lighter to handle; the big hive is too heavy for ladies, and I personally could not handle a large hive. If you take an eight-frame Langstroth and put a shallow Langstroth below, you have equal to a ten-frame hive, and you have something better than a ten-frame hive, because you can control it, and if you want a large hive take a ten-frame hive and put a shallow below it, and you will have something better than a large frame because you can control it. I do not like a Langstroth hive, but if you like it you can use it with a shallow and you will get all the comforts you want. We call this shallow hive "The Safety Valve," because there is room for the queen to go below.

THE CHAIRMAN: As a user of a deeper hive I would like to say that if I have a queen that does not keep the comb full of brood I do not think it is the fault of the hive. I want a queen that keeps the box full of brood, and if she does not I put a mark on her.

SPECIAL APPLIANCES AND MOTOR TRANSPORTATION FOR APIARY WORK.

E. T. BAINARD, LAMBETH.

I am glad that Mr. Deadman brought out the point about the Heddon hive, because we use it altogether in our apiary. We are working for extracted honey, and the honey is all brought home and extracted in one central place. We have used an eight-frame Heddon, and we are now using a ten-frame. Before we take off the supers, there is a certain amount of burr comb between, and we want that broken so that the bees will clean up the burr. We go out in the apiary and take an instrument and break it loose so as not to jar the bees. We raise up the frames and put on a bee escape-board. This same thing can be used on a regular standard Langstroth hive, but you would have to make it about four inches longer, and you would have to have a small staple on the end of the frame. (See page 52.)

The next thing I will show you is a hive lifter. We have been using one for four or five years. This lifter only weighs 23 pounds, and there is no trouble to put it over the colony and lift it up. The stands we have our hives on are made for four colonies, and the hive lifter when set over the hive is perfectly level, and we have a cleat nailed to the hives to lift them by. These holes that you call "hand holes," I call "finger holes." The cleat we have nailed on works much better. The finger hole is so shallow that it is difficult to attach the machine to it. You can lift 200 pounds with this lifter, and a ten-year-old boy can work it.

MR. ROOT: How would it work on uneven ground?

MR. BAINARD: It would probably not work quite so well. There is no trouble to put this lifter in an automobile and take it to any yard you want to. You do not require it until you have three or four supers on.

Another thing we have tried this year is steam for heating honey, and we use a small steam boiler. We find steam will not injure the honey. This year we got caught with a tank full of candied honey, and we made a coil of three-quarter inch pipe about twenty inches long, and we put that in the boiler and turned on the steam, and it settled down through the honey and did not injure it. You can regulate your temperature as you like. We also use a honey pump. We always strain our honey and allow it to settle, and by heating the honey we find we can use a pump. As the pump works, the honey is worked up inside this steam jacket and it is warmed up, and it strains much better.

Our tanks are five feet high, and we had trouble in keeping the strainer across the tank, and we had a cover made of wire cloth. We were always thinking the tank was going to overflow, and we cut small holes in the side of the tank and also in the cover, and there was no danger of it overflowing, because we had a small spout that takes the honey back to the extractor. No doubt most of you use cotton cheese cloth for straining, but we have found a better material; it is called scrim.

Q.—Is not that pretty coarse?

A.—We have not found it so. It strains better.

Q.—Can you buy it in drygoods stores?

A.—Yes. They call it scrim, and it will last for a long time.

Another appliance we have is a method of embedding wire in foundation by means of the hydro-electric current. This is the best way to put foundation on, but you must regulate the current, and not have it too strong. There are various methods of reducing the current, and there is danger of fire. An expert electrician should be employed for fitting up the apparatus.

Q.—What weight of foundation do you use?

A.—We use ordinary section foundation. That may be a little light, and it might pay to use a heavier foundation.

MOTOR TRANSPORTATION.

About six years ago, I commenced to use the automoible. The first trailer I had was a two-wheeled outfit, and the front part of the box went on the back part of the automobile. I got that idea from a Michigan beekeeper, and it worked all right while we had a runabout. When I got a five-passenger car I simply used a light waggon. I took the shafts off and put on a short tongue. When it is running empty I have to use a strap to strap it down. When we are going empty, we are liable to exceed the ordinary speed limit. If you go 12 or 15 miles an hour, it shakes the waggon, and it helps to hook it down at the front end. I like four wheels on the waggon better than two, as there is not so much shake. If you want to make a short turn, it is an easy matter to unhook the waggon and turn it round. Pneumatic tires, no doubt, are the best, and I am planning to fix up a trailer with four pneumatic tires. In starting the load you should not jerk, but make an even start. We bring home a ton of honey at a time. We put fifteen hundred pounds in the trailer, and the balance in the back seat of the Ford.

We tried the experiment this year of moving 48 colonies of bees to where there was buckwheat. We had 40 miles to go, and I arranged with another man to take

his auto and help out. I secured two light waggons, and we attached them to the autos. We had some pretty steep hills to climb. We calculated that if we got stuck we could double up. We started from Lambeth about 11 o'clock and went to St. Thomas, and from St. Thomas to Aylmer. In hauling home honey, I like to go as slow as possible and keep the engine cool, because you can get more power out of a gas engine if it is kept cool. In August the roads are always good, and we take the hood off the engine so that the heat will get away quickly. Always have plenty of water with you to keep the engine cool. We had 24 colonies in each waggon, or about 1,300 lbs. We have a special clip that goes over the top of the rear spring, and we have a bolt with a big thumb nut that goes on there to attach the trailer.

Q.—Did you have the auto loaded as well as the trailer?

A.—No, we use galvanized covers, and I had the covers in the back end of the auto.

Q.—Did you ever see a motor roadster with a rack behind?

A.—That is the car I had first. I prefer to have the load on the waggon, if the roads are dry you are all right. It was stated in one of the Journals some time ago that it was better to have the load on the waggon, and that you could drag more behind an auto than you could carry in it.

Q.—You are using four wheels on the trailer now?

A.—Yes, I started with two wheels. A two-wheeled trailer seems to swing too much.

MR. PETTIT: On a light truck you would get the most swing forward and back, and you should load your hives the same as you would load a railway car.

MR. ROOT: We have loaded them both ways, and it does not seem to make much difference. We began using a large truck, and we have been getting them smaller and smaller, as we find they cost less for repairs. We still have a big car, but the little fellow is used a dozen times for each time the big car is used. We put a little waggon box on the end of the small motor, and we haven't burst our tires yet.

THE CHAIRMAN: I have a trailer that I had made to order. We have drawn 3,000 lbs., and two boys and three men. Of course we don't do that every time.

MR. PETTIT: I have found it an advantage to have an extra leaf put in the back spring and to use a shock absorber. Rubber bumpers on the back spring help. I never tried to carry more than 1,200 lbs. of honey on the truck, but after Mr. Krouse's experience I do not think I will worry about the weight of the load.

MR. ROOT: I want to say a few words about honey conditions in Canada and the United States. Extracted honey is nearly all cleaned up in the United States. We have had four or five men trying to buy honey, and they find it very difficult to get. There is plenty of comb honey in the United States. The grocers have it and the wholesalers have it. Two years ago we carried over one hundred thousand dollars worth of comb honey, and some of it granulated on our hands. If any of you have comb honey on hand, I would advise you to hold on to it until the extracted honey is out of the way, and then you will get a good price for it. Moving it from a warm room to a cool room is not good for comb honey. You can keep comb honey best in a warm room. Our extracted honey has been selling at from 2½ cents to 3½ cents less than yours. You are exceedingly fortunate in being in a locality where you can get a very fine grade of honey and good prices. The beekeepers of Ontario have bright prospects before them, and now you are not looking for sunshine but for snow.

MR. DUNN: The representative of the McDonald Manufacturing Company was to be here this afternoon. He informed me that they would be able to supply containers in March or April. He thought there would be no shortage next year. In fact, he offered to sell me some now.

THE CHAIRMAN: It is a pleasure to see so many present at our last session.

The Convention adjourned with the singing of "God Save the King."

SWEETENED POISON MIXTURES.

GEO. F. KINGSMILL, ASSISTANT TO THE PROVINCIAL APIARIST.

In the season of 1915, the cutworms and grasshoppers became such serious pests in certain parts of the country that poison baits had to be employed to eradicate them. These poisoned mixtures were sweetened, and the question at once arose if such mixtures were injurious to the bees. As far as could be learned from the results of other investigators, the bees would not work on the poisoned mashes, but the experiments previously recorded have for the most part been conducted during a honey flow, when the bees were working on the nectar-producing plants, and hence, would not stop to touch the mashes. The following experiments were conducted this past September, when frost had checked all nectar secretion and bees were ready to rob whenever an opportunity afforded.

The control of grasshoppers recommended by the Department of Entomology at the Ontario Agricultural College, is as follows:—

1. Break up old pastures—the breeding places—by ploughing 5 or 6 inches deep in late fall or in spring.
2. Use the New Poison Bran Mixture.

Bran	20 lbs.
Paris Green	1 lb.
Molasses	½ gallon.
Water	about 2 gallons.
Lemons	2 or 3 fruits.

METHOD OF APPLICATION.

Mix thoroughly the bran and paris green dry in a tub or any large receptacle. This may be done the night before. On morning of using, squeeze the juice of the lemons into the water, run the pulp and rind through a meat chopper, and add this and also the molasses to the water, stir well, and then pour the liquid upon the poisoned bran, and mix so thoroughly that every part is moist and will fall like sawdust through the fingers. Apply in the morning between five and seven o'clock by scattering so thinly over the infested field, fence corners and roadsides, that the above amount will cover four or five acres. Sometimes a second application about three days later is necessary.

Don't delay using until damage has been done, and don't look for results until two or three days after applying.

This mixture was scattered about in the apiary when the bees were flying freely. A few bees—twelve bees in forty minutes—did visit the small piles of the mixture, but in no case do I think they obtained anything of an injurious nature

from their visits. The bees, possibly from curiosity, would alight upon small piles of pure bran without any sweetening whatever, and only rarely would one stay more than half a minute or so.

Control of Cutworms.

1. Plough fields as soon as possible after crop is off, to prevent weeds springing up and attracting moth to lay eggs.

2. Use poisoned bran mash, applied about sunset; a spoonful or a little less dropped beside each plant is sufficient. Make mash as follows: Place 50 lbs. of bran in a box, moisten with about 1 patent pail of water sweetened with molasses or cheap sugar. Add one lb. of paris green by dusting a little over it at a time, then mixing well and repeating till the green can be seen everywhere through the bran. Do not add too much water, but just enough to moisten, so that the mash will fall through the fingers like sawdust. It is also often desirable to scatter a little of this poisoned material over the ground a day or two before setting out cabbage or tomatoes to attract the cutworms and kill them.

A mixture made in the following proportions was scattered about the apiary:—

Bran	2½ lbs.
Sugar	1 cup.
Water	1 quart.
Lemons	½ fruit.

The bees did not visit this at all. During the hour not a single bee alighted near the mixture.

Forty-Seventh Annual Report

OF THE

Entomological Society

OF ONTARIO

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1917

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TORONTO

To His Honour, Sir John Strathearn Hendrie, a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.,

Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

The undersigned begs to present for the consideration of your Honour, the Report of the Entomological Society for 1916.

Respectfully submitted,

William H. Hearst,

Minister of Agriculture.

Toronto, 1917.

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FORTY-SEVENTH ANNUAL REPORT

OF THE

Entomological Society of Ontario

1916

To the Honourable William H. Hearst, Minister of Agriculture:

SIR,—I have the honour to present herewith the Forty-seventh Annual Report of the Entomological Society of Ontario, containing the proceedings of the Fifty-third Annual meeting, which was held at Guelph on the 2nd and 3rd of November, 1916.

The meeting was well attended and the interest shown by those present in the papers and addresses presented was evident from the lengthy discussions by which they were followed. A full report of these papers and discussions is contained in the following pages, together with the reports of the various officers and branches of the Society.

The work of the Society continues to expand and has been much increased by the activities of the British Columbia and Nova Scotia Branches.

The Canadian Entomologist, the Society's monthly organ, continues to maintain a wide circulation and a high standard of scientific value. In the forty-eighth volume now completed the series of articles on Popular and Practical Entomology, begun in the preceding volume, has been continued regularly and has done much to widen its usefulness and interest to the general reader.

I have the honour to be, Sir,

Your obedient servant,

EDMUND M. WALKER,
Editor.

Biological Department,
University of Toronto.

Entomological Society of Ontario

OFFICERS FOR 1916-1917

President—Mr. Albert F. Winn, Westmount, Que.

Vice-President—Prof. Lawson Caesar, Dept. of Entomology, Ontario Agricultural College, Guelph.

Secretary-Treasurer—Mr. A. W. Baker, B.S.A., Lecturer in Entomology, O. A. College, Guelph.

Curator—Mr. W. Evans, O. A. College, Guelph.

Librarian—Rev. Prof. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., Professor of Entomology and Zoology, O. A. College, Guelph.

Directors—Division No. 1, Mr. Arthur Gibson, Entomological Branch, Dept. of Agriculture, Ottawa; Division No. 2, Mr. C. E. Grant, Orillia; Division No. 3, Dr. A. Cosens, Parkdale Collegiate Institute, Toronto; Division No. 4, Mr. F. J. A. Morris, Peterborough; Division No. 5, Mr. J. W. Noble, Essex, Ont.; Division No. 6, Mr. W. A. Ross, Vineland Station, Ont.

Directors (ex-Presidents of the Society)—Rev. Prof. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., Guelph; W. Hague Harrington, F.R.S.C., Ottawa; Prof. John Dearness, Vice-Principal Normal School, London; Rev. Thos. W. Fyles, D.C.L., F.L.S., Ottawa; Prof. Wm. Lochhead, B.A., M.S., Macdonald College, Que.; John D. Evans, C.E., Chief Engineer, Central Ontario Railway, Trenton; Prof. Tennyson D. Jarvis, Grimsby East; Prof. E. M. Walker, B.A., M.B., F.R.S.C., University of Toronto; C. Gordon Hewitt, D.Sc., F.R.S.C., Dominion Entomologist, Ottawa.

Editor of "The Canadian Entomologist"—Prof. E. M. Walker, Toronto.

Delegate to the Royal Society of Canada—Mr. F. J. A. Morris, Peterborough, Ont.

FINANCIAL STATEMENT

For the Year Ending October, 31st, 1916.

Receipts.		*Expenditures.*	
Balance from 1914-15	$23 82	Cork and pins	$91 59
Dues	151 60	Printing	1,185 49
Subscriptions	428 73	Expense	70 20
Advertising	38 25	Salaries	250 00
Government grant	1,000 00	Library	6 53
Reports and back numbers	105 31	Annual meeting	59 15
Cork and pins	111 07	Annual report	170 00
Bank interest	11 91	Bank exchange	10 15
		Balance on hand	27 58
	$1,870 69		$1,870 69

To balance due printers	$66 96
By cash on hand	27 58
Net deficit	$39 38

Auditors: L. Caesar.
J. E. Howitt.

Respectfully submitted,
A. W. Baker,
Secretary-Treasurer.

LIST OF MEMBERS

Ontario.

Andrews, H. D. ..... Toronto.
Astwood, J. C. ..... Port Arthur.
Baker, A. W. ..... Guelph.
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Clemens, W. A. ..... Toronto.
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Harrison, G. T. ..... Thornloe.
Hewitt, Dr. C. Gordon ... Ottawa.
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McKechnie, J. B. ..... "
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Mossop, Miss B. K. E. ... Toronto.
Nash, C. W. ..... "
Noble, J. W. ..... Essex.
Petch, C. E. ..... Ottawa.
Ross, W. A. ..... Vineland.
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Shorey, W. P. ..... Vineland Sta.
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Smith, Arthur ..... Toronto.
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Wood, S. T. ..... Toronto.
Wright, Capt. W. H. .... Guelph.
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Brainerd, Dwight ..... Montreal.
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Chagnon, G. ..... Montreal.
Clayson, G. H. ..... "
Corcoran, J. A. ..... "
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Dunlop, G. C. ..... Montreal.
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Gibb, L. ..... Montreal.
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Lochhead, Prof. W. ..... Macdonald College.
Moore, G. A. ..... Montreal.
Poirier, M. ..... "
Southee, G. A. ..... "
Baird, Thomas ..... High River.
Winn, A. F. ..... Westmount.

Alberta.

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Bentley, Lettice ..... Lethbridge.
Bowman, K. ..... Edmonton.
Carr, F. S. ..... "
Dod, F. H. Wolley ..... Midnapore.
Imeson, Miss V. ..... Barons.
Mackie, Donald ..... Edmonton.
Moodie, Miss ..... Ogden.
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Whitehouse, F. C. ..... Red Deer.

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Nova Scotia.

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Allan, E. Chesley ..... Yarmouth.
Baird, W. W. ..... Nappan.
Blair, W. S. ..... Kentville.
Brittain, Prof. W. H. .... Truro.
Cann, E. Mabel ..... Yarmouth N.
Conrad, Ethel M. ..... Halifax.
Craig, I. C. ..... Amherst.
Creighton, G. ..... Halifax.

De Wolfe, L. A. .....Truro.
Dickey, C. M. .....Kentville.
Distant, Mary S. .....Halifax.
Dustan, A. G. .....Bridgetown.
Gilliatt, F. C. .....Granville Centre.
Good, C. A. .....Truro.
Gooderham, C. B. ..... "
Goodwin, Alberta .....Stewiacke.
Henrion, Miss C. .....Halifax.
Jennison, Mary .....Truro.
Lindsay, Harriet E. .... "
MacPherson, Dr. Hugh ..Antigonish.
McGregor, Anna .....South River Lake.
McKay, Dr. A. H. .....Halifax.
Mitchell, Lillie J. ..... "
Moses, Agnes .....Brooklyn.
Payne, H. G. .....Granville Ferry.
Payne, S. H. ..... "
Perrin, Joseph .....Halifax.
Sanders, G. E. .....Bridgetown.
Scott, Prof. J. M. .....Truro.
Shaw, Prof. P. J. ..... "
Shipton, J. W. .....Moschelle.
Sinclair, Nellie .....South River Lake.
Smith, M. Lois .....Truro.
Spittall, J. P. ..... "
Trevoy, Nellie M. .....Brighton.
Wetmore, Ralph .....Yarmouth.
Whitehead, W. E. .....Kentville.
Whitman, C. F. U. .....Lawrencetown.
Williams, C. M. .....Nappan.
Young, Ermina .....Brighton.
Young, M. E. .....Middleton.

SASKATCHEWAN.

Androchowicz, E. .....Humboldt.
Bentley, Miss L. .....Mellville.
Hutchinson, H. .....Starblanket.
Neville, S. J. .....Cottonwood.
Ritchie, J. D. .....Vanguard.
Willing, Prof. T. N. .....Saskatoon.

MANITOBA.

Criddle, Norman .....Treesbank.
Hippesley, Mrs. W. W. ..Winnipegosis.
Hunter, Dr. A. J. .....Teulon.
Wallis, J. B. .....Winnipeg.

BRITISH COLUMBIA.

Abriel, T. .....Nakusp.
Anderson, E. M. .....Victoria.
Anderson, J. R. ..... "
Baggs, A. E. .....Vancouver.
Bayley, H. ..... "
Blackmore, C. H. .....Victoria.
Brinkman, M. ..... "
Bryant, T. .....Ladysmith.
Bush, A. H. .....Vancouver.
Cockle, J. W. .....Kaslo.
Cunningham, C. .....Victoria.
Day, G. O. .....Vancouver Island.
Downes, N. .....Saanichton.
French, P. E. .....Salmon Arm.
Gavet, D. .....Vancouver.
Gemmel, M. .....Sechelt.
Getchell, F. H. .....Vancouver.
Hadwen, Dr. S. .....Agassiz.
Hamilton, J. A. .....Vancouver.
Hanham, A. W. .....Duncan's Station.
Harris, Miss M. .....Deroche.
Hoy, B. .....Vernon.
Hook, G. .....Cobble Hill.
Howitt, M. W. .....Prince Rupert.
Hugh, W. .....Victoria.
Lallemand, C. F. .....Lytton.
Leach, D. H. .....Salmon Arm.
Martin, A. .....Vancouver.
Matthews, C. W. ..... "
Middleton, M. .....Nelson.
Parham, G. L. .....Invermere.
Raley, G. .....Chilliwack.
Robertson, W. H. .....Victoria.
Robson, A. C. U. ..... "
Ruhman, M. .....Vernon.
Sherman, R. S. .....Vancouver.
Stevens, M. G. ..... "
Taylor, L. E. .....Kelowna.
Thornber, C. L. .....Vancouver.
Thornber, H. .....Kamloops.
Treherne, R. C. .....Agassiz.
Venables, E. P. .....Vernon.
Ward, W. E. .....Vancouver.
Warren, Miss E. .....Barnston Island.
Wilkerson, G. E. .....Victoria.
Wilson, Tom .....Vancouver.
Winslow, R. M. .....Victoria.
White, E. W. .....Sardis.

HONORARY MEMBERS

Cockerell, Prof. T. D. A...Boulder, Col.
Comstock, Prof. J. H. ....Ithaca, N.Y.
Cresson, Ezra T. ..... Philadelphia, Pa.
Felt, Dr. E. P. .....Albany, N.Y.
Howard, Dr. L. O. .....Washington, D.C.
Wickham, Prof. H. F. ...Iowa City, Ia.

LIFE MEMBERS

Bethune, Rev. C. J. S. ... Professor of Entomology, Ontario Agricultural College, Guelph.
Evans, John D., C.E. ....Trenton.
Fyles, Rev. Dr. T. W. ....Ottawa.
Reed, E. Baynes ..... " Director of the Meteorological Station, Victoria, B.C.

The Entomological Society of Ontario

ANNUAL MEETING

The Fifty-third Annual Meeting of the Entomological Society of Ontario was held at the Ontario Agricultural College, Guelph, on Thursday and Friday, November 2nd and 3rd, 1916. The President of the Society, Mr. A. F. Winn, Westmount P.Q., occupied the chair. The following were present during the sessions: Dr. L. O. Howard, Chief of the Bureau of Entomology, Washington, D.C.; Prof. P. J. Parrott, Geneva, N.Y.; Prof. E. M. Walker, University of Toronto; Prof. W. Lochhead, Macdonald College, P.Q.; Prof. W. H. Brittain, Truro, N.S.; Dr. C. Gordon Hewitt, Messrs. A. Gibson and J. M. Swaine, Entomological Branch, Ottawa; Messrs. W. H. Harrington and F. W. L. Sladen, Ottawa; Rev. Father Leopold, La Trappe, P.Q.; Mr. F. J. A. Morris, Peterborough; Mr. J. Dunlop, Woodstock; Prof. J. Dearness, London; Mr. W. A. Ross, Vineland Station; Mr. W. E. Biggar, Hamilton; Mr. N. Criddle, Treesbank, Man.; Mr. A. B. Baird, Fredericton, N.B.; Professors C. A. Zavitz, J. E. Howitt, C. J. S. Bethune, L. Caesar, J. W. Crow, D. H. Jones, E. J. Zavitz and S. B. McCready, Dr. R. E. Stone, Capt. G. J. Spencer, Messrs. A. W. Baker, A. H. Tomlinson, G. H. Unwin, C. R. Klinck, G. F. Kingsmill, E. Hearle, A. W. Guild, R. M. Aiton, J. B. McCurry and W. Evans, Ontario Agricultural College.

On Thursday morning a meeting of the Council was held in the Entomological Laboratory, at which the report of the proceedings during the past year was drawn up and various matters relating to the Society's welfare were discussed. A recommendation was made that Mr. John D. Evans, of Trenton, a past President of the Society and a most useful adherent for many years, should be elected a life member. This was subsequently done at the general meeting. It was decided that the next annual meeting be held at Macdonald College, Que. The President proposed that information regarding the principal collections of insects in Canada, both public and private, should be procured and published in the *Canadian Entomologist* from time to time.

At 1.30 p.m., the Society met in the Entomological Lecture-room. The President, Dr. Hewitt, took the chair and the proceedings commenced with the reading of the reports of the various officers of the Society and directors of the various divisions on the insects of the year.

REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario begs to present its report for the year 1915-1916.

The Fifty-second Annual Meeting of the Society was held at Ottawa on Thursday and Friday, November 4th and 5th, 1915; the President, Dr. C. Gordon Hewitt, occupied the chair. The attendance was very gratifying, members being present from nearly every Province of the Dominion, and also several eminent entomologists from the United States, and Mr. C. P. Lounsbury, Chief of the Division of Entomology, Pretoria, South Africa. A large number of papers of interest and importance were read and discussed. The usual public lecture was

given by Prof. H. T. Fernald, of Amherst, Mass., on "Life Zones in Entomology and Their Relation to Crops," on the Thursday evening, and on Friday evening the members were the guests at a smoker given by the Ottawa Field Naturalists' Club. The morning and afternoon sessions were occupied by the reading of papers and the presentation of reports from the officers of the Society and the Directors of several of the Divisions.

The following is a list of the papers: "Insects of the Season in Ontario," and "The Imported Willow or Poplar Borer or Curculio," by Prof. L. Caesar; "Side Injury and Codling Moth," by Dr. E. P. Felt; "The Home of Gortyna stramentosa," by Mr. A. F. Winn; "Insects of Ste. Anne's, Que., Season of 1915," and "The Occurrence of Tychius picirostris on Clover at Ste. Anne's, Que.," by Mr. E. M. Du Porte; "Observations on Parasitic and Predaceous Hymenoptera," by Dr. T. W. Fyles; "The Leaf-weevil in New York," by Messrs. P. J. Parrott and H. Glasgow; "The Green Apple-bug in Nova Scotia," by Mr. W. H. Brittain; "A Capsid Attacking Apples," by Mr. H. G. Crawford; "The Founding of the Science of Cecidology," by Dr. A. Cosens; "The Army Cutworm in Southern Alberta," by Mr. H. E. Strickland; "Life Zones in Entomology and Their Relation to Crops," by Prof. H. T. Fernald; "Some Notes Regarding Nose and Other Bot-flies," by Prof. W. Lochhead; "The Seasonal Prevalence of Hypoderma bovis in 1915," by Dr. S. Hadwen; "Progress of Entomology in Canada during 1915," by Dr. C. Gordon Hewitt; "The Life-history of Chermes cooleyi in Stanley Park, B.C.," by Mr. R. N. Chrystal; "The Cabbage-maggot—Autumn Development in B.C.," "The Cabbage-maggot in B.C.—Natural Control," and "Preliminary List of Canadian Parasitic Insects," by Mr. R. C. Treherne; "The Brown-tail Moth and Gypsy-moth situation in Relation to Canada," by Mr. J. D. Tothill; "Control of the Brown-tail Moth in Nova Scotia," by Mr. G. E. Sanders; "The Work Carried on in the United States Against the Gipsy and Brown-tail Moth," by Mr. A. F. Burgess; "Leaf-rollers Attacking Apples," by Prof. L. Caesar; "Locust Control Work with Poisoned Baits in Eastern Canada in 1915," and "The Entomological Record," by Mr. A. Gibson.

The Canadian Entomologist, the official organ of the Society, has been regularly issued each month; the forty-seventh annual volume was completed in December, 1915. It contained 417 pages and was illustrated with seventeen plates and thirty smaller figures in the text. A series of monthly papers on "Popular and Economic Entomology" added much to the interesting character of the contents; 21 new genera and 101 new species and sub-species were described. The contributors to its pages numbered sixty-one, and included writers in Ontario, Quebec, Nova Scotia, Manitoba, Alberta, British Columbia, fourteen of the United States, Honolulu, Japan and Finland. It is gratifying to know that, while subscriptions from the enemy countries of Europe have been discontinued, the number of subscribers has considerably increased.

Owing to the fact that most of the members of the Society in Guelph were taking military drill, the regular meetings of the Society during 1915-16 were few in number, and were largely of a business character. During the year, however, the following papers were read:

"Methods of Rearing, Studying and Combating Cut-worms and Army-worms in Western Canada," by Mr. F. W. Walsh; "Parasitic Work in Nova Scotia," by Mr. A. B. Baird; "Syrphus Flies and Their Role in the Control of Aphids," by Mr. H. Curran.

During the year seventy-six new members have been added to the rolls of

the Society. Many members are absent on military service; where the dues of these members have not been paid they have been retained in membership without payment of dues wherever the Council knew they were in service.

It is with much regret that the Council has to record the loss of Captain R. V. Harvey, for many years the energetic Secretary of the British Columbia Branch, who was severely wounded in action in France and died in a German prison. We have also to deplore the loss of one of our esteemed honorary members, Mr. F. M. Webster, chief of the section of Cereal and Forage Insect Investigations in the Bureau of Entomology at Washington, D.C., who died at Columbus, Ohio, immediately after the meeting of the American Association for the Advancement of Science on the 2nd of January last. He was elected an honorary member of our Society in October, 1899, and always took an interest in our proceedings. His last visit to us was in August, 1913, when he attended our Jubilee meeting and read an interesting paper. An appreciative obituary notice by Dr. Hewitt was published in the March number of *The Canadian Entomologist*.

REPORT OF THE CURATOR.

During the past year no accessions have been made to the Society's collections. They have all been gone over several times and are kept entirely free from Museum pests. Donations of uncommon species of Lepidoptera and Coleoptera, and of almost anything in the other orders, would be very acceptable and gratefully acknowledged.

G. J. Spencer, *Curator.*

REPORT OF THE LIBRARIAN.

During the year ending October 31st, 1916, forty-two bound volumes have been added to the Library, making the number on the register 2,262. A large number of unbound bulletins, reports, periodicals and pamphlets continue to be received from authors and publishers and in exchange for *The Canadian Entomologist*. Many of these are arranged in pamphlet-cases, and can be referred to without much difficulty. A certain amount of binding has been done recently, and, if funds permit, a considerable number more of important periodicals will be rendered available in this way for easy reference and a permanent place upon the shelves.

The excellent Library that we possess is being constantly made use of by the staff and students of the Biological Department of the Ontario Agricultural College, and to some extent by members of the Society at a distance.

Respectfully submitted,

Charles J. S. Bethune, *Librarian.*

REPORT OF THE MONTREAL BRANCH.

The 43rd annual meeting of the Montreal Branch was held at 794 St. Urbain St., Montreal, Que., on Saturday evening, May 13th, 1916.

The Secretary read the report of the Council as follows:

The Branch has held, during the season 1915-1916, eight monthly meetings, the average attendance being nearly seven.

We record with pleasure three new members added to our roll during the year.

During the year the following papers were read:

1. Annual Address of the President ..... A. F. Winn.
2. Notes on the Natural History at the Toronto Fair ..... Geo. A. Moore.
3. Collecting Hemiptera at Bondville, Que., August 1-13, 1915 .. Geo. A. Moore.
4. Lepidoptera taken by Geo. A. Moore at Bondville, Que..... A. F. Winn.
5. The Home of Gortyna Stramentosa, Guenée ..... A. F. Winn.
6. Notes on Hemiptera taken at Bondville, Que. ..... Geo. A. Moore.
7. The Reduviidae and Allied Families taken at Bondville, Que.... Geo. A. Moore.
8. A Few Remarks About the Genus Plagodis ..... A. F. Winn.
9. Colias Alexandra, Edwards ..... A. F. Winn.
10. Talk on the Entomology of British Columbia ..... R. C. Treherne.
11. Talk on Insect Behaviour ..... E. M. Du Porte.
12. Membracids taken at Bondville, 1915 ..... Geo. A. Moore.
13. Variation . . .. A. F. Winn.
14. Talk on the Making of Microscope Sections of Insects' Eggs. Dr. J. A. Corcoran.
15. Talk on Making Slides of Genitalia ..... G. Chagnon.

Our meetings were held at the residences of members except the February meeting which was held in the "Lyman Entomological Room," Redpath Museum, McGill University. This meeting was of particular interest. Fifteen were present, amongst whom were Prof. Lochhead with four others from Macdonald College and Mr. Treherne, Secretary of the British Columbia Branch. A pleasing event of this meeting was a presentation to our President, Mr. Winn, of an engraved silver plate from Lord Rothschild in recognition of his work in entomology. The presentation was made by Mr. Gibb who was in Canada on a visit.

One outing was held to St. Hilaire on May 24th.

The report of the Librarian showed our library in good order.

The report of the Treasurer showed a good balance in hand.

The following officers were elected for the ensuing year:

President ..... A. F. Winn.
Vice-President ..... G. Chagnon.
Secretary-Treasurer ..... Geo. A. Moore.
Librarian ..... G. Chagnon.
Council ..... G. A. Southee, E. C. Barwick, H. M. Simms, Dr. Corcoran.

Geo. A. Moore,
Sec.-Treas.

REPORT OF THE TORONTO BRANCH.

The Toronto Branch of the Entomological Society of Ontario begs to report as follows on the work of the Branch for the year 1915-1916.

The twentieth annual meeting was held in the Biological Building on Thursday, October 26th, 1916, the President, Dr. Walker, in the chair.

The minutes of the previous meeting having been read and approved the reports of the Council and the Treasurer were presented and adopted.

Eleven meetings, including the annual meeting and one field meeting, were held during the season, the average attendance at the regular meetings being about twelve, including visitors, of which a few were present at most of the meetings.

During the past year seven new members were elected. These are: Miss B. K. E. Mossop, Miss Marjorie Ford, Miss Norma Ford, Kenneth Kirkwood, T. B. Kurata, George Graham, and H. V. Andrews.

The financial statement showed a balance in hand of $3.52.

The following list comprises the papers and lectures of the season:

Oct. 14. "The Founding of the Science of Cecidology." A. Cosens.
Nov. 18. "Notes from Newfoundland." E. M. Walker.
Jan. 4. "The Spiders of Canada," illustrated by lantern slides. Prof. J. H. Emerton, Boston, Mass.
Jan. 27. "Canadian Longicorn Beetles," illustrated with specimens. E. M. Walker.
Mar. 2. "The White Wax Industry of Sey Chuan," illustrated by lantern slides. P. M. Bayne.
Mar. 30. "Bacterial Control of Insects." C. E. Petch, Ottawa.
Apr. 25. "Bombidae," illustrated with specimens. C. W. Nash.
May 30. "Mosquitoes and Their Relation to Human Disease," illustrated with lantern slides. E. M. Walker.
June 22. "Some Important Achievements in Entomology." A. Cosens.

On June 30 a field meeting was held at Lambton.

The election of officers for the ensuing year resulted as follows:

President ..... Dr. E. M. Walker.
Vice-President ..... Dr. W. A. Clemens.
Secretary-Treasurer ..... Shelley Logier.
Librarian ..... Miss B. K. E. Mossop.
Council ..... Dr. A. Cosens, Mr. T. B. Kurata, Mr. C. W. Nash and Mr. J. Hannibal.

The Toronto Branch regrets to record the death of one of its oldest and most valued members, Mr. J. B. Williams, who died on the 28th of May, 1916.

Respectfully submitted,

Shelley Logier,

Secretary-Treasurer.

REPORT OF THE NOVA SCOTIA ENTOMOLOGICAL SOCIETY.

The second annual meeting of the Entomological Society of Nova Scotia was held at Truro, on August 4th, 1916, some 105 persons being in attendance. The proceedings took the form of a short business session in the morning, followed by the reading of papers at the afternoon and evening meetings. Following the afternoon session a short collecting trip was made, during which a number of interesting captures were made and discussed.

The following officers for the year were elected:

Hon. President ..... Dr. A. H. McKay, Halifax.
President ..... E. C. Allen, Truro.
Vice-President ..... L. A. DeWolfe, Truro.
Secretary-Treasurer ..... W. H. Brittain, Truro.
Assistant Secretary-Treasurer... G. E. Sanders, Annapolis.
Committee ..... J. M. Scott, Truro; A. G. Dustan, Annapolis.

W. H. Brittain,

Secretary-Treasurer.

REPORT OF THE ENTOMOLOGICAL SOCIEY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA.

F. J. A. Morris, *Peterborough.*

I have the honour to present a report of the Entomological Society of Ontario for the year 1915-1916.

The Society continues to flourish; its growth in the short interval since our Jubilee Year has been remarkable, and to a close observer will reveal a most healthy condition—deepening as it broadens; this vertical growth (marked by a greater intensity of work) is even more vital than the lateral expansion of the Society over a wider field.

The branching tendency of the parent stem is amply evidenced both west and east; for in the still young B.C. branch there has been dichotomy into branchlets at Victoria and Vancouver, while in Nova Scotia an entirely new and vigorous branch has lately thrust forth. Both these extensions are due to members of the Society employed in the work of economic entomology: Mr. Treherne in the west and Dr. Brittain in the east.

There can be no question that the Society owes its present exuberance in very great measure to the comparatively recent institution of our Agricultural Colleges and the giant strides over the Dominion, in the last decade, of Economic Entomology. The scientific training in biology, acquired by a whole army of field officers and other Government employes in connection with Agriculture, enables these young and energetic students of nature to grapple with problems in insect anatomy and physiology, in life-histories, in systematic and descriptive work that would baffle, should they ever confront, the amateur. And these graduates are called to the most distant and diverse fields of labour.

All this is clearly reflected in the pages of our magazine: every month shows work of permanent value in economic entomology, and articles that may fairly claim the title of monographs in many special departments of the Science, articles coming from writers in all parts of the Dominion and beyond.

It is worthy of note how many contributors to our Ontario magazine are distinguished authorities of the U.S.A.—some of them men of world-wide reputation. Insects, of course, are too doggedly cosmopolitan to be daunted by the immigration officer, whether clearly undesirables or belonging only, like the rest of us, to the great class of those who have not yet been found out. Under these conditions our Science knows no artificial boundary and will not be so confined. But it has often been remarked by members of the Society, and at our annual meeting last November, where it found ample illustration, it drew a comment from the guest of honour, Dr. Fernald, of Amherst, Mass., how cordial are the relations of give-and-take in Entomology between the United States and Canada.

Obviously, in the borderland, steps taken by one country's Government to control insect pests, benefit the other; but it is not in economic work only that these friendly relations are found to subsist. Many of the finest articles contributed to the "Canadian Entomologist" by specialists over the line, have reference to rare, entirely new, or hitherto unrecorded captures made within our borders by Canadian members of the Society, and sent for determination to recognized masters of the craft.

Among contributions of importance from native pens may be mentioned articles by the emeritus editor, Dr. Bethune; the editor, Dr. Walker; the Dominion

Entomologist and ex-President of the Society, Dr. Hewitt; the President of the current year, Mr. Winn, of Montreal; Messrs Caesar and Baker, of Guelph; Dr. Cosens, of Toronto; Messrs. Gibson, Swaine and Sladen, of Ottawa; Messrs. Wolley Dod and Strickland of Alberta; Messrs. Criddle and Wallis, of Manitoba; and Mr. Sanders, of Nova Scotia.

We have noticed also in the pages of the magazine since last report, reference to the insect fauna of Chile, Guatemala, British Guiana, the Philippines, Australia, India, Sweden and Finland.

Among *personalia* may be mentioned a delightful sketch of the late Prof. Croft, of Toronto University, from the pen of our esteemed Dr. Bethune, an appreciation of the great Jean Henri Fabre, and an obituary notice of our late honorary member Francis Marion Webster, both written by Dr. Gordon Hewitt.

The interest of the Society's periodical has greatly broadened under the capable hands of its editor, not only by the inclusion of two new sections, one of Popular Entomology, the other of Notes and Queries, but still more by systematic insertions from authoritative centres of activity, selected with wise judgment from diverse points of the United States and Canada.

The annual meeting held in Ottawa last November was one of the most successful in the whole history of the Society, representing practically all its interests over the whole wide area of its membership. The papers and articles there presented are now in the press and will shortly appear as the 46th Annual Report of the Society. They include a very large amount of research work of the greatest practical value and of a high order of scientific merit.

The titles and authors' names (see 46th Annual Report, Table of Contents) may be left to speak for themselves and for the full significance of that November meeting; with perhaps a single exception, which I crave leave to make more explicit; to wit, the supreme importance of work done on the spot by field laboratories, no fewer than nine of which have now been established in various parts of the Dominion, under the auspices of the Entomological Branch of the Dominion Department of Agriculture.

REPORTS ON INSECTS OF THE YEAR.

Division No. 1, Ottawa District—Arthur Gibson, Entomological Branch, Ottawa.

Attacking Field Crops.

Fortunately there were no serious outbreaks of field crop insects in the district of eastern Ontario which I have the honor to represent. The dull, rainy weather of spring and early summer undoubtedly interfered in the development of many species.

Locusts. Early in the season a few reports were received which indicated that young hoppers were appearing in numbers, but on investigation later we learned that the insects disappeared suddenly, owing to adverse weather conditions. We had arranged to conduct further experiments in the control of these insects with poisoned baits, but no fields sufficiently infested with locusts could be located in the Ottawa district.

Cutworms. Reports of damage by these caterpillars received early in June referred particularly to injury to cucumbers, beans, peas and other vegetables in

gardens. The Red-backed Cutworm, (*Euxoa ochrogaster* Gn.), was most in evidence.

Root Maggots. The Cabbage Maggot (*Phorbia brassicae* Bouche), and the Onion Maggot (*Hylemyia antiqua* Mg.)were again present in the Ottawa district, but the damage was not so extensive as in 1915. Some experiments which we conducted in the control of the latter insect by spraying with sodium arsenite indicated that such control is promising, and further work along this line will be done as opportunity occurs. Such control is discussed in Bulletin No. 12 of the Entomological Branch, issued in May, 1916.

The Potato Flea Beetle (*Epitrix cucumeris* Harr.). In the latter half of June this insect was present in noticeable numbers. Injury to the leaves of tomato was especially complained of.

The Corn Ear Worm (*Heliothis obsoleta* Fab.). A few complaints of injury to the ears of sweet corn were received in early September. On September 5th larvae in the last stage were found. The work of the caterpillars is seldom noticed until the injury has taken place. Fortunately this insect is not an important one in the Ottawa district.

The Banded Ips (*Ips fasciatus* Oliv.). On September 22, I found this beetle present in a few ears of corn in our experimental plots at the Central Experimental Farm. Several kernels in one ear had been destroyed. This injury is an unusual one, and so far as I know has not previously been reported in Canada. Similar injury has been recorded in the United States.

The Salt Marsh Caterpillar (*Diacrisia acraea* Dru.). This woolly bear was found in small numbers (August 11th) feeding on leaves of cabbages at Rivermeade, close to Ottawa. Although this caterpillar has a wide range of food plants the injury it causes is local. It can hardly be classed as a pest of importance. Handpicking will usually be sufficient as a control measure.

The Parsnip Webworm (*Depressaria heracleana* DeG.). At the Central Experimental Farm, the Dominion Horticulturist reported, on July 10th, an outbreak of the caterpillars of this insect in a patch of parsnip which he was growing for seed purposes. The larvae were numerous, on one day 170 were removed by hand from the plants.

The Zebra Caterpillar (*Ceramica picta* Harr.). An interesting outbreak of this well-known caterpillar occurred in eastern Canada during the autumn of 1916. In some sections the larvæ were present in thousands, stripping the tops of turnips, and also injuring other plants, chiefly mangels and cabbages. One outbreak which occurred near Ottawa effected particular damage to rhubarb.

The Ash-Gray Blister Beetle (*Macrobasis unicolor* Kby.). Reports of injury by this blister beetle to potatoes were received in early July. In one field which I visited on July 13th many of the plants had been entirely defoliated. Numbers of the beetles were present on the vines. Unfortunately, they have the habit of appearing suddenly and oftentimes eating the entire foliage of plants upon which they alight in a day or two. One grower protected his potato crop by dusting with arsenate of lead.

Attacking Fruit and Forest Trees.

No special outbreaks of insects attacking fruit or forest trees came to my attention during the season. The Pear-leaf Blister Mite (*Eriophyes pyri* Pag.) was found freely on the foliage of apple on July 11th. The Black Walnut Caterpillar,

(*Datana integerrima* G. & R.) was more than usually abundant, being found on walnut and hickory. Other common pests such as the Oyster Shell Scale, (*Lepidosaphes ulmi* L.), the Imported Currant Worm, (*Pteronus ribesii* Scop.), the Codling Moth, (*Carpocapsa pomonella* L.), etc., were more or less destructive in the district.

Garden and Greenhouse Insects.

Cutworms were frequently complained of as injuring plants in gardens. Sweet peas were freely attacked in one garden in the first half of June. At Meach Lake, Que. (near Ottawa) flowering plants were being injured at the end of June. The Red-backed Cutworm was the most commonly-occurring species.

The Tarnished Plant Bug (*Lygus pratensis* Linn.), was present in conspicuous numbers. Some growers of dahlias and zinnias claimed that large numbers of the buds had been destroyed by the insect. In one garden in Ottawa the bugs were very numerous in the middle of July, one lady reporting that almost all the zinnia plants in her garden had been destroyed. Unfortunately, there is no satisfactory remedy known for the control of this insect. Some growers claim to have had partial protection by dusting powdered tobacco over the buds or other portions of the plants which are attacked.

The Yellow Woolly Bear (*Diacrisia virginica* Fab.). Noticeable injury was caused by this caterpillar in gardens, particularly to the foliage of hydrangea. In the middle of July when some leaves were examined the larvæ were about half an inch in length. The leaves were conspicuously skeletonized in places.

Household Insects.

Ants. Some interesting experiments in the control of ants in houses were conducted during the past season. Near Chelsea, Que., about nine miles from Ottawa, perfect results in ridding summer cottages of ants were obtained by dusting sodium fluoride where the insects were numerous. This new remedy was also used in Ottawa and other places, and reports of success in all cases were received. In our own experiments the species of ants concerned were the common carpenter ant (*Camponotus pennsylvanicus* DeG), and the shed builder ant (*Cremastogaster lineolata* Say). An account of these experiments was published in the November 1916, issue of the "Canadian Entomologist."

Roaches (*Blattella germanica* Linn.). Sodium fluoride was also used with success in Ottawa in ridding a house of these objectionable insects. The powder was simply dusted in the places which were frequented by the roaches and almost immediately they began to disappear. Within a week no individuals were to be seen, where previous to the use of the powder the insects were present in numbers.

Carpet Beetles. The two carpet beetles, namely, the true Carpet Beetle, or Buffalo Moth (*Anthrenus scrophulariae* L.), and the Black Carpet Beetle (*Attagenus piceus* Oliv.), were reported as being present in destructive numbers in houses in Ottawa. No exceptional injury however was noted.

A few complaints were also received of the presence in houses of the Indian Meal Moth (*Plodia interpunctella* Hbn.) and the Confused Flour Beetle (*Tribolium confusum* Duv.). The former was found attacking breakfast cereals and the latter infested flour.

DIVISION NO. 3, TORONTO DISTRICT—A. COSENS.

In spite of the extremely hot, dry weather of July, August and September, nothing particularly striking was noted to indicate that the insect life was affected by the unusual character of the season. Some injurious insects were indeed rather more plentiful than usual, but others were not so common.

THE ZEBRA CATERPILLARS, *Mamestra picta*, were exceedingly abundant on several species of plants. Even at the date of writing, the end of October, specimens of these yellow-striped larvæ are occasionally seen, crawling over the still green foliage of such plants as the clovers and asparagus. North of the city considerable damage was done to crops of turnips by this pest.

While the aphides were not so troublesome this season on the cultivated honeysuckles, another insect was found to be seriously injuring them. On some shrubs nearly every leaf was puckered and deformed by the mining of the larvae of

Galls produced by *Pontania petiolaridis* Rohwer on the leaves of *Salix petiolaris* Sm.

Phyllonoryeter (*Lithocolletis*) *fragilella* Frey and Boll. The work of the insect is very characteristic and easily recognized, since the under sides of the infested leaves are covered with blister-like patches owing to the lower epidermis having been left intact, when the underlying mesophyll was eaten out. The larvae are from 5-6 mm. in length, and light-yellow in colour. They enter the ground after the fall of the leaves and emerge as moth early in the Spring. Gathering and destroying the leaves before the larvæ leave them, is, at this time of the year, the most apparent method of bringing the pest under control.

An almost spherical, sawfly gall is produced on the leaves of *Salix petiolaris* Sm., a native willow that is not uncommon in low ground near the city. The deformity closely resembles the conspicuous apple-like gall of *Pontania pomum* Walsh, but differs from this species in some details of structure. The host plants of the two galls differ as *Pontania pomum* is restricted almost, if not entirely, to

Salix cordata Muhl. In their attachment to the leaves of their hosts they also vary as the species on *Salix petiolaris* is almost equally divided by the blade, while *Pontania pomum* projects, only very slightly, from the upper side of the leaf. Further, the former species is hollow from the earliest stages, but the latter only becomes so when eaten out by the larvæ. A number of the galls from *Salix petiolaris* Sm. were collected in 1915, just before the fall of the leaves, and were kept, out-of-doors, in jars containing earth, during the winter. The adults began to emerge April 15th, and were sent to Mr. S. A. Rohwer, Washington, D.C., who has kindly replied as follows: "I have made a preliminary examination of the species and find that it may easily be distinguished from *Pontania pomum* and that it comes near to *P. pisum*. I think the species is undoubtedly new."

An interesting observation was made concerning this new species of sawfly, namely that the aperture of exit is prepared a considerable length of time before the larvæ leave the galls. Just what conditions finally prompt their departure and why their means of escape have to be ready, are points not yet cleared up.

Since all sawfly galls are well advanced in development before the larvæ are hatched, it is safe to conclude that the chief stimulus to abnormal growth must emanate from the ovipositor of the insect. The sawflies, when depositing eggs, clasp the opening buds with their legs and insert their sawlike ovipositors into the young leaves from the under side. Into each of the incisions, thus made, an egg is injected. The larvæ, as soon as hatched, commence to feed upon the substance in the interior of the gall, but leave the rind uninjured.

Since the pear-slug, *Eriocampa cerasi* Peck makes a similar incision in the leaf, without causing an abnormal production of tissue, it is highly probable that in the case of the sawfly gall-producers, the stimulus is not due to the mechanical effect of the cutting, but to a chemical action arising from the introduction of some substance by the ovipositor of the insect.

A specimen of the Compton Tortoise, *Vanessa j-album*, seen April 7th, marked the opening of the entomological season, and throughout the summer butterflies in general, were plentiful. In this connection the unusual abundance of the Monarch, *Anosia plexippus* L. should be noted. Since 1906, specimens of this species, have not been so numerous in this locality. During August, abundant evidence was furnished at different places of their congregating habits. On the island the poplars and willows were favorite resting sites for large flocks. The instinctive tendency to migrate southward in the autumn must have been the stimulus that impelled them to seek this outlying station. At different times straggling lines of these insects were noted moving westward along the lake shore.

Pontania petiolaridis New Species, Rohwer.

Belongs to Group 3 of Marlatt, and is closely allied to *salicis-pisum* Walsh, but may be distinguished from that species by the dark brown stigma, and by having the third antennal joint shorter than the fourth, and the third cubital cell much longer than high.

Toronto, Ontario. Described from a number of females and males reared by A. Cosens from galls on *Salix petiolaris*.

Type.—Cat. No. 20697, U.S.N.M.

A more extended description of this species will be published in connection with other species of this genus.

Division No. 5, Port Hope District— Francis J. A. Morris, Peterborough.

Your Director has been specializing almost entirely in *Cerambycidae* this season, and few observations in other families and orders have been made. The Report for the year will present, in brief pageantry, the procession of summer months from Spring to Autumn.

Early in April before the snow had entirely gone two or three specimens of *Disonycha triangularis* were noticed in the muddy ruts of a side road west of Peterborough; nearly a fortnight later two more specimens of the same beetle were captured in a similar situation north of Port Hope. During two very hot bright days in Easter week, large numbers of a beetle about the size of the common "June bug" were observed flying rapidly along just over the grass, and occasionally soaring up about the boulevards in Toronto; no capture was made, but the habit of flight makes probable their identification as *Euphoria inda*. This beetle we have never seen captured in the district of Port Hope or Peterborough; it is probably abundant west of Toronto, and has been taken about Orillia. Whether it breeds in S.W. Ontario or not, I do not know; at any rate it would seem to have spread by flight to a great distance from its original breeding ground. Its absence from the central district immediately north of Lake Ontario may be due to its low habit of flight; this would render a wide stretch of water a formidable barrier.

During the last week of April, and the first week of May, three specimens of *Hylotrupes ligneus* were taken in and about the City of Peterborough. From the first week of May for more than three weeks, specimens of *Pachyta monticola* were abundant; on Victoria Day upwards of 30 were captured in various blossoms, such as Crinkle-root (*Dentaria diphylla*), white Trillium (*Trillium grandiflorum*), large-flowered Cranesbill (*Geranium maculatum*), and—its favorite host—Early Elder (*Sambucus racemosa*). On the same shrub in the third and fourth weeks of May, several specimens of *Syneta ferruginea* were observed, and about the foliage of wild raspberries in the first two weeks of June this beetle was very abundant. *Lina interrupta* was taken feeding (as usual in this neighbourhood) on alder, and its next of kin, *Lina scripta* was found abundant on willows—especially low bushes bordering wet meadows and swamps. Observations made in 1914 and 1915 in regard to forms of the genus Chrysomela and their various food plants were renewed; one or two specimens of a more robust *Chrysomela scalaris* than that noticed on alder were captured; these had a more normal sculpture of the elytra and would seem to have bred out on basswood foliage.

On June 4th, while collecting about the margin of a wood some miles southeast of Peterborough, we noticed among some *Cyrtophorus verrucosus,* feeding on blossom of choke-cherry, a beetle very similar, but smaller and less prominent on the thoracic disc and elytral bases. Close examination of the insect showed it to be identical with a unique specimen captured in Port Hope on spiked maple in the year 1907. This insect had been returned from Montreal in 1909, labelled as the male of *Microclytus gazellula* Hald.; it being assumed for purposes of such determination that the length of the antennal joints 2, 3 and 4 *inter se* in that genus (as described by LeConte and Horn) was true only of the female, while the male had them proportioned as in *Cyrtophorus*. Twelve specimens of the beetle were captured on this day (June 4th, 1916) all on choke-cherry and among them a pair in conjunction; they all proved to have the proportion of joints 2, 3 and 4 constant, and as in *Cyrtophorus*. Between June 12th and June 18th, three more specimens were taken on the blossom of spiked maple. With the unique specimen of 1907, there was therefore a series of sixteen for purposes of comparison.

In all sixteen the second joint of the antennae was distinctly less than half the length of the fourth, somewhere between a quarter and a third the length. In the genuine *Microclytus gazellula,* the second joint is distinctly more than half the length of the fourth, somewhere between two-thirds and three-quarters the length. After the specimens had been thoroughly relaxed the antennae were drawn out taut over the back; in eight specimens the antennae proved as long as the insect, and in eight they were about three-quarters the length. One may fairly assume such a difference to be a sex distinction; probably the same difference will be found to distinguish the two sexes of *Microclytus gazellula* Hald., but it is most improbable that any difference in the proportionate length of joint 2 to joint 4 of the antennae should be found separating the sexes. Other differences are noticeable between this guest of the choke-cherry and *M. gazellula,* but whether the insect should be placed under the genus *Cyrtophorus* or under *Microclytus* I am not in a position to decide.

On June 13th seven specimens of *Callidium ianthinum* were captured on the bark of white cedar—newly cut fence rails. In the third week of June many Longicorns were captured on dogwood blossom; these included *Molorchus bimaculatus, Callimoxys sanguinicollis, Clytanthus ruricola, Cyrtophorus verrucosus, Encyclops caeruleus, Gaurotes cyanipennis, Leptura capitata, L. exigua, L. vittata, L. pubera, L. ruficollis* (with var. *sphaericollis*), *L. vibex, L. mutabillis;* these were all abundant; a single specimen of *L. sanguinea* was also captured, and a species not yet identified. In the same week along the C.P.R. east of the City of Peterborough, several colonies of *Lema trilineata* were observed on patches of ground cherry (Physalis), and on wild convolvulus 3 species of tortoise-beetle, *Coptocycla aurichalcea, C. guttata,* and *Chelymorpha argus.* Feeding on pollen the female of *Hoplia trifasciata* was frequently seen at this time, but only a single male; a collector in Port Hope who noticed this beetle earlier in the season, found the male predominant; this appears to be the rule of that species; the male appears first in great numbers about hawthorn and other blossoms; a week or two later, the males become rare and the females then become abundant. Owing to the unusually wet and cold weather in May and June many beetles seem to have been retarded. The first newly emerged Elder-borer this season was taken on June 22nd, nine days later than last year's record. In the third and fourth weeks of June many interesting species of *Elater* and *Buprestid* were taken, especially the genus *Corymbites.* On June 25th, north of Port Hope, a single specimen of *Lina tremulae,* a European leaf-eater, was captured on a poplar; it is known to occur in Massachusetts and Michigan. On the same day a small Longicorn hitherto new to your Director was observed on the leaf of a wild grapevine; a careful search resulted in the capture of a second specimen on grapevine about a mile further east in the district north of Port Hope; a third specimen on grapevine was taken in Trenton on June 27th; but persistent search of grapevines for more than a week failed to secure any more; the beetle was *Hyperplatys aspersa.*

While staying for a few days in Trenton at the end of June, your Director made some interesting captures. At Weller's Bay on June 28th, *Leptura lineola* was taken in abundance on dogwood blossom in low-lying wet hardwood bushes. At Glen Ross on the Trent, June 29th, was captured a small black *Oberea,* said to be the variety of *bimaculata* known as *basalis Lec.* It was taken on a wooded hillside among the undergrowth. Six specimens of the same creature were captured in flight, a few years ago, in an almost identical situation north of Port Hope; among the flora characteristic of such upland slopes are hazel bushes, wild rose,

bergamot, Painted Cup (*Castilcia*) and Orange Lily. The insect is about eight millimetres in length, slightly over a millimetre wide across the thorax, entirely black, except for a patch of dusky orange on the disk of the thorax which serves to throw into relief, but still indistinctly, a pair of black spots at the centre. In the same district several leaf-eating beetles were observed in great abundance; on oak bushes *Attelabus analis*—over a score being counted on a single twig; on two or three species of undergrowth a large black *Pachybrachys;* and on Fragrant Sumach (*Rhus canadensis*) the larvæ and beetles of *Blepharida rhois.* Last year we ventured to claim for this larva absolute immunity, due to its disgusting coat of liquid excrement. To our astonishment we observed this day a large yellow plant-bug regaling himself on these unsavory morsels with all the relish of a sand boy picking out periwinkles with a pin.

On July 1st, during a tramp about the Big Swamp, Murray Township, north of Wooller, three or four specimens of *Leptura chrysocoma* were found feeding in the blossoms of that beautiful flower, the Swamp Valerian (*V. silvatica*). They were right out among the tamaracs almost in the heart of the swamp. Besides tamarac, a very few white pine and several spruce trees stood in this corner of the swamp. On July 2nd, at the same spot, *Leptura chrysocoma* was found feeding round the edge of the swamp, rare on fleabane, occasional on valerian, and abundant on yarrow heads; over 30 specimens were captured.

On July 5th a trip to some woods east of the Otonabee River, just north of Hiawatha, yielded good results. On some dying balsam a pair of *Acanthocinus obsoletus* and a pair of *Xylotrechus undulatus* were taken. On some fallen beech three species of *Agrilus* were seen, including *bilineatus* and *obsoletoguttatus;* also seven specimens of *Neoclytus erythrocephalus,* two of *Xylotrechus colonus,* two of *Urographis fasciatus,* and a single specimen of *Hoplosia nubila.* Of this last, four specimens have been taken about Peterborough since 1914, three on basswood and one on beech, confirming the hearsay statement of Blatchley in regard to the hosts of this beetle. Some fallen beech were examined in another quarter on July 14th, and a large number of *Xylotrechus colonus* and *Urographis fasciatus* were taken on the under side of the trunks. On July 10th and 13th, a newly felled grove of white pine was visited. Trunks, limbs, branches, twigs and foliage were all carefully examined, as well as the surrounding shrubs and herbage. Two species of *Monohammus* were found abundant, *confusor* and *scutellatus,* while a third, *titillator* was taken occasionally. These were mostly on the trunks; about limbs and branches, especially where broken and piled up— decay being further advanced here—were found several specimens of *Acanthocinus obsoletus* and *Leptostylus sex-guttatus;* besides these, eight or nine specimens of *Neoclytus muricatulus* were captured, running rapidly over the trunks and limbs in the hot sunshine. Till 1916 we had never seen this insect except on white pine, but two specimens were captured this July on white spruce, one on July 14th near Peterborough, and the other at the end of July in the Algonquin Park. Close by these pines, both fallen and standing, three *Acmaeops* were taken, two *Acmaeops pratensis* (on yarrow heads) and a single *Acmaeops proteus.* During the same trip a very minute specimen of *Pogonochaerus mixtus* was noticed on the bark of a pine log. Three or four only of these beetles have been taken on white pine during ten years of collecting, and it has never appeared common till this season. During the second week of July two hosts were discovered for the little Lamiinid *Hyperplatys aspersa.* These were the American aspen (*Populus tremuloides*) and the staghorn sumach (*Rhus typhina*); as several other borers were found in the same company, the two accounts are kept separate.

It was on July 6th that we first noticed *Hyperplatys aspersa* on the top of a woodpile. This pile consisted entirely of *Populus tremuloides*, cut into short-length cylindrical billets, the bark still on; the billets ranged from two or three to six or seven inches in diameter. During ten days, six visits were made to the woodpile; on each of the last three visits every billet in the pile was lifted and turned over for inspection, with the following result:

Hyperplatys aspersa, 117. (These insects were not collected after the fourth visit, though several were seen).

Liopus variegatus 13.
Liopus cinereus 6.
Acanthoderes sp? 2.
Pogonochaerus mixtus 2 (var. *salicola*, Casey.)
Parandra brunnea 1.
Saperda calcarata 1.

Also, several species of Endomychid, Clerid, Elaterid, Buprestid, Tenebrionid, and Rhynchophorid beetles.

During the same period Dr. Watson, of Port Hope, was having a similar experience about dying branches of sumach; his captures included *Goes oculata*, *Leptostylus macula*, *Liopus cinereus*, *Lepturges signatus* and *Hyperplatys aspersa*.

The weeks from July 18th to the end of August, were spent in the Algonquin Park. About Cache Lake, on fallen balsam and spruce (besides white pine), *Monohammus confusor* and *M. scutellatus* were both observed; on spruce were captured single specimens of *Tetropium cinnamopterum*, *Neoclytus muricatulus* and the Melandryid, *Phlocotria quadrimaculata* (*Dircaea liturata*); on balsam, a single specimen of *Xylotrechus undulatus*. Apparently breeding about the branches of a small felled white pine over 100 specimens of *Pogonochaerus mixtus* were captured in five weeks. Several specimens of *Leptostylus 6-guttatus* were also taken on white pine. Half a dozen specimens of *Leptura canadensis* (all female) were taken about the woods, and as many (all male) feeding on spiræa blossom; no female was seen on blossoms. On spiræa were also taken both sexes of *L. subhamata*, *L. proxima*, *L. vagans* and some other common species; also two specimens of a very dark form of *L. plebeia;* this beetle had never been taken before 1916; but on July 6th we had been fortunate enough to observe a specimen settle on the trunk of a large white pine, just low enough not to afford one more tantalizing example of how the human enthusiast's reach exceeds his grasp.

Not many observations of economic interest were made during the season. Depredations of the willow-boring weevil were in further evidence about Port Hope where some specimens were noticed as early as the first week of June; in that neighbourhood it was found also on *Populus tremuloides*, and near Oshawa on Balm of Gilead; a patch of willows near Peterborough was noticed in September badly damaged by this insect. The wet May and June caused aphids to be quite a severe scourge to foliage, especially elm, poplar and maple. Grasshoppers in the later summer were terribly destructive, though less so in the Port Hope district (Mr. Duncan tells me) than elsewhere. Apple and other fruit trees whose branches were a riot of blossom in May and June managed to set very little fruit, the disastrous rains of the early summer having prevented insect fertilization.

DIVISION NO. 6, ESSEX DISTRICT—J. W. NOBLE, DEPARTMENT OF AGRICULTURE, ESSEX.

ATTACKING FIELD CROPS.

WIRE WORMS AND WHITE GRUBS. During the wet spring of 1916 these pests did considerable harm to corn and other cereals; sugar beets were also destroyed and some damage was done in the onion fields. June beetles and click beetles seemed quite plentiful during the summer months and the writer obtained several of the former by the use of a lantern and pan of water covered with kerosene.

ATTACKING FRUIT TREES

CODLING MOTH (*Carpocapsa pomonella*). Owing to the continued rainfall during the month of June the codling moth was very prevalent this spring. Very few side entrances have been found which would suggest that most injury was caused by first brood. In neglected orchards it seems that there is over ninety per cent. of the fruit affected.

PLUM CURCULIO (*Conotrachelus nenuphar*). The injury of this beetle was very prevalent on plums especially during the past season; although not so plentiful upon the apples.

SAN JOSÉ SCALE (*Aspidiotus perniciosus*). Practically all uncared for orchards have been ideal breeding grounds for this pest this season and a large quantity of affected fruit is offered upon the markets. The pest is practically absent in well kept orchards.

TENT CATERPILLARS (*Malacosoma americana* and *M. disstria*). These pests seemed more prevalent than usual this year; the unsightly webs of both species were found in several orchards and woods. *M. americana* is the more common although neither can as yet be considered of great economic importance.

APHIDS. These insects have done considerable harm in deforming the fruit in neglected apple orchards. On some of the smaller crops they did great damage and will be discussed later.

CHERRY FRUIT FLY (*Rhagoletis cingulata*). This was the most important pest of the sour cherry this year. Very few sweet cherries bore fruit this season but in former years this fly injured both types.

LESSER PEACH TREE BORER (*Aegeria pictipes*). Some orchards have been ruined by this pest.

INSECTS AFFECTING SMALL FRUITS AND VEGETABLES.

STRAWBERRY SAWFLY (*Empria ignota*). On a number of patches during the past season the writer has observed injury from this species, the chief injury being that the fruit failed to ripen. Spraying with hellebore was successfully carried out in two fields.

MELON APHIDS (*Aphis gossypii*). Fifteen thousand dollars is a conservative estimate of the damage borne by the melon growers during the past summer and a great loss to the pickle growers was also sustained. Twenty-five per cent. of the crops of inside cucumbers was lost by the lice. Successful spraying outside with tobacco decoction was demonstrated by this Department and good results were shown by inside fumigation with nicofume and black leaf 40.

CABBAGE ROOT MAGGOT (*Pegomyia brassicæ*). Probably for the first time in this district this insect has caused a great deal of damage this season. Some crops of early cabbage were almost a failure.

Onion Root Maggot (*Pegomyia ceparum*). This is another arrival to report this season. In Mr. Caesar's report of last year I note he states that he could scarcely find a root maggot in this district. Unfortunately this is not the case in 1916. Great damage was wrought during the past season to the onion growers.

Onion Thrips (*Thrips tabaci*). The writer has seen thousands of these insects in small areas during the past season. The characteristic white lines on the leaf indicated that they were doing considerable damage. We have tried almost all recommended remedies with indifferent success. They especially thrive in tobacco decoction. The writer has taken an onion covered with thrips, immersed it in the strong solution of tobacco for five minutes, then laid it in the sun and in a few minutes the insects seemed invigorated by the experiment.

Tobacco Worm (*Phlegethontius quinquemaculatus*). As in former years this insect has cost the tobacco growers thousands of dollars in injury and labor to pick the worms. Successful work is being done by some growers in having the worms picked by ducks. The method of poisoning by attracting the moth to baits has been found satisfactory. This season one grower has killed more than a half bushel from three poisoned Jamestown plants (*Datura stramonium*).

Greenhouse Insects.

The chief greenhouse pests during the past season have been aphids, white fly and cucumber beetle. Successful fumigation for the former two has been carried on with nicofume, black leaf 40 and hydrocyanic acid gas, but a great deal of harm has been done by the beetle and methods of control are rather difficult. Hand picking has been practiced with the greatest success, but is rather laborious.

District No. 7, Niagara District—William A. Ross.

Orchard Insects.

Comparatively few complaints were made this past season about the depredations of apple insects. This was largely due, I think, not to the scarcity of noxious insects but to the fact that evils such as the codling worm and the plum curculio were overshadowed by a greater evil—apple scab.

Codling Moth (*Carpocapsa pomonella*). Side injury by this species was more noticeable on apples this season than it was last year.

Plum Curculio (*Conotrachelus nenuphar*). This insect was less injurious in the Vineland district than it has been for some time past.

The Green Apple Aphis (*Aphis pomi*). Early in the summer conditions were very favorable for the rapid development of plant lice. The weather was warm and there was a superabundance of food—succulent growth produced by the heavy spring rains. The apple aphis took full advantage of these conditions and it multiplied and spread at an alarming rate. During July the infestation was so severe that in certain orchards which I had under observation all the young shoots and watersprouts were covered with masses of green lice. The outbreak reached its height about the end of July and then, thanks to the effects of the drought, it commenced to decline very rapidly until by the last of August very few aphides were present on the trees.

San José Scale (*Aspidiotus perniciosus*). Apart from noticing an unusual quantity of scale-infested apples in certain Vineland orchards, I made no observations on this pest.

The Pear Psylla (*Psylla pyricola*). The cold, wet weather of spring was so fatal to the eggs and newly hatched nymphs of this species that our spraying tests in a Vineland orchard were completely nullified. The check pear trees proved to be as clean as the sprayed trees.

The Imported Spider Mite (*Tetranychus pilosus*). This acarid was again common on plums and apples. Our experiments with the mite prove that lime sulphur wash (summer strength) will readily control it.

Beneficial Orchard Insects.

One of the most important enemies of the green and rosy aphides of the apple in the Niagara district is a small reddish cecidomyiid maggot. I have observed this creature at work during the past three seasons but did not have it identified until this year. The species is *Aphidoletes meridionalis,* Felt.

The feeding habits of this cecidomyiid are interesting. In attacking its victim the maggot, as a general rule, attaches its mouth parts to a leg joint and then proceeds to gorge itself on the body juices. The favorite point of attack is the articulation of the femur and tibia. (In one instance a maggot was observed with its mouth parts attached to the base of an antenna.)

The ladybirds *Hippodamia convergens* and *Coccinella novemnotata* were exceptionally common. During the summer both species were found feeding freely on the green apple aphis.

Pests of Small Fruits.

The Blackberry Leaf Miner (*Metallus rubri*). A large blackberry plantation near Vineland was seriously infested by this sawfly.

So far as I am aware no satisfactory method of combating the miner has yet been discovered.

The Raspberry Sawfly (*Monophadnus rubi*). This species was again very injurious.

The Imported Currant Borer (*Aegeria tipuliformis*). Complaints about the work of the borer were received from Burlington.

Shade Tree Insects.

Black Walnut Caterpillar (*Datana integerrima*). It was no uncommon sight this past season to see Black Walnut trees which had been wholly or partially defoliated by this caterpillar.

Fall Web-Worm (*Hyphantria cunea*). The ugly nests of this insect were unusually abundant on shade and fruit trees. In several instances all the foliage on young trees was destroyed.

Linden Insects.

The Basswood Leaf-miner (*Chalepus rubra*), and an undetermined species of lace-bug were very common on Linden in the Horticultural Experiment Station wood-lot.

Miscellaneous Pests.

Onion Thrips (*Thrips tabaci*). What might have been a serious outbreak of onion thrips in the Horticultural Experiment Station vegetable gardens was kept within bounds by the effective work of a predaceous flower bug, *Triphleps tristicolor*. B. Wh.

Associated with *Thrips tabaci*, but not so numerous as it, was another species of *Thysanoptera*, viz.: *Aeolothrips fasciatus*.

Potato Beetle (*Leptinotarsa decemlineata*). This well known pest was more abundant around Vineland this past season than it has been for the last three years.

Horse Flies. During the hot weather of July and early August the green-headed horse fly, *Tabanus costalis*, was remarkably abundant and unusually troublesome.

The Clover Mite (*Bryobia pratensis*). Early in June I received an urgent call from a horrified householder in Vineland to help him to expel or to exterminate certain minute horrors which had invaded his "best" bedroom. On visiting the house I found the bed clothes in the infested room literally alive with clover mites. As the invaders were in possession of the bed only, I suggested the immediate removal of the mattress and clothes to the lawn. This was done. The mattress was aired for some time, the bed clothes were laundered and nothing more was seen of the mites.

Scarred Apples.

Last month a local fruit grower drew my attention to a peculiar type of insect injury which was very common on the fruit of several Rhode Island Greening trees. The apples were marked here and there with calloused blemishes, which varied in shape from dots to long, irregular, serpentine areas. Although the blemishes were only skin deep they were sufficient in themselves to degrade No. 1 fruit to No. 3.

Scarred Apple.

As I was unable to determine the cause of the injury I submitted specimens to Profs. Caesar and Parrott, but neither could diagnose the trouble. Prof. Parrott's answer to my inquiry is quoted herewith:

"I am by no means certain as to the cause of the injury. During the past year we have discovered such injury upon apples, and specimens of peaches have

been forwarded to us injured in a manner quite similar. I spoke to Mr. Knight of Cornell University regarding the damage and he intimates that such injuries may attend the work of red bugs. In the specimens of fruit that have been sent to us from New York it is certain that the apples were first punctured by either red bug or an insect with similar habits. However, the remarkable thing about the injury is the development of a large irregular callous that stands out in marked contrast to the normal epidermis of the fruit."

I have brought some of the scarred apples along with me for your examination and I hope that some one present will be able to enlighten me as to the cause of the injury.

THE NATURALIST IN THE CITY.

Rev. Thomas W. Fyles, D.C.L., Ottawa.

The lover of nature, whose avocations or infirmities limit his field of observation, may yet have opportunities for gratifying his tendencies, and adding to his knowledge of living things.

With your permission I will tell briefly of a few creatures that have engaged my attention during the periods of my life in cities.

In a paper I read before the Society last year, I told of an assembly of *Thalessa lunator* Fab. upon a scar on a limb of a Red Maple growing beside the house I now occupy. Early in the present year (1916), a strong gust of wind took the limb I speak of and snapt it off at the injured part. On examining it I found that decayed wood extended for at least two feet from the point of fracture. This touch-wood presented an interesting appearance. In it were the tunnels formed by *Tremex columba* Linn., closely packed with frass for much of their length. In them the larvæ of *Thalessa lunator* had found and devoured their prey. There were other tunnels (some of which opened out into those of the Tremex) and these were stored with dead flies of various kinds. Among the flies were the capsule-like cases, or cocoons of a species of wasp. They somewhat resembled the cocoons of the mud-wasp, *Pelopæus cementarius* Drury; but whereas the Pelopæus cocoons were brown and semi-transparent, showing the insect within, these were of a clay-yellow and opaque. They were also somewhat smaller.

At intervals in the beginning of June there came from these cocoons specimens of *Crabro singularis* Smith.

I also found in the decayed wood the mangled remains of *Tibicen rimosa* Say.

The fate of the fine limb of the shade tree I have spoken of should be a warning against injudicious pruning.

In my studies of the Mud-daubing Wasps I have been able to follow the life-history of *Pelopæus coeruleus* Linn. This is a more compact insect than *cementarius,* and in hue it is of a brilliant royal purple. Its cells resemble those of *cementarius,* and are found in association with them. The perfect insects, about the first week of July, bite neat round ways of exit from their winter prisons, and commence active operations very soon after. They are industrious collectors of spiders. I have counted as many as nine spiders in one of their cells. One egg only is laid by the mother wasp in each cell, and the grub that comes from it feeds upon the spiders. It is full-fed by the end of August and commences to spin its cocoon. The grub is of the usual sphex shape—somewhat attenuated towards the head, which is small and has dark nippers. The cocoon resembles that of

cementarius. In it the larva remains quiescent through the winter. In June the larval skin shrivels up, and the pupa, a wonderfully beautiful object, appears. It is as if it were formed of the purest translucent white wax. Its various parts are exquisitely fashioned, and symmetrically arranged. Towards the end of June the pupa begins to take colour: the eyes assume a pale chestnut tint—this changes to black. The thorax and wing-cases also become deep black. In the first week of July the complete metamorphosis has taken place, and the perfect insect comes forth in all its beauty.

I have mentioned *Tibicen rimosa* Say. This is a rare insect in Quebec Province, but its near relative *Cicada canicularis* Harris is very abundant.

One afternoon, in the early sixties, I was walking under a row of noble elm trees that grew along one of the upper-town streets of Montreal, when I noticed a large insect of rather a disreputable appearance crawl from the earth and begin to ascend a tree. Its proceedings interested me. After climbing for a foot it dug its claws—and it was well provided with claws—into the bark of the tree, to secure its hold, and then began to sway itself violently from side to side, as if troubled with a sharp internal disorder. Something will result from this paroxysm, I thought to myself, and something did result. Its skin parted along the back, from face to abdomen, and then the creature began to crawl through the gap it had made, drawing its legs from their cases as if it were taking off its boots. Its wings, which had been neatly plaited in side cases, were gradually unfolded, and in a quarter of an hour the perfect insect seemed to be ready for flight.

That large insects, such as *C. canicularis,* where they are present in numbers, must damage the trees by tunneling in them is evident. In passing, and by way of bringing this home, let me say, that, in my grounds at South Quebec there stood, in the open, a well-grown, shapely spruce—I suppose fifteen inches in diameter at the base. One windy day in the summer the tree broke off at the base. It was pierced, in every direction, by the mines of the "Forgeron" (as the French call it—the Blacksmith (*Monohammus scutellatus* Say), the black, titillating beetle, with the white lunette on its shoulders.

Leaving the insects let us for a few minutes consider some of the birds that frequent the city or occasionally visit it.

Last year, in the month of June, a young Night-hawk (*Chordeiles virginianus* Linn.) fluttered down from the flat roof of the after part of the house I now occupy on Frank Street, Ottawa. It lit upon the kitchen door-steps. When approached it merely cowered down, and then, without a struggle, allowed itself to be carried back to the roof from which it had fallen. A few days after another young bird, a male of the same species, tumbled to the same spot. I secured it with my entomological net, carried it up-stairs and let it go through a window. It partly opened its great length of wing and shuffled away behind a chimney.

The past summer was marked by frequent thunder-storms. On the 25th of June there was one of extreme violence. A stately elm, that grew in the vacant ground behind my house, was rent, through the centre, from top to bottom, by a lightning flash. When the storm was at its height I looked out upon the roof I have spoken of, and I was startled. Within three yards of me was a female Night-hawk sheltering her young with her ample wings. The rain descended in torrents, but, with marvellous patience, she maintained her position.

The greys and browns of the night-hawk's plumage, together with its white markings, blend with the tints of the pebbled roof of the city dwelling—or those of the waste place in the country—which the mother bird may select on which to deposit her eggs. The eggs resemble pebbles.

Another bird, the plumage of which befits its customary haunts, is the Ruffed Grouse (*Bonasa umbellus togata* (Linn.) Ridgw.). The females of this species when brooding on their nests are no doubt often saved from molestation by their colouring and the death-like stillness that they keep when foes are near.

The Ruffed Grouse (in the vernacular—*Partridge*) is not a familiar object in our city streets; but some years ago, when my home was in Hull, P.Q., I, one day, received a great surprise: I looked from an upper window and saw, amidst the potted plants on the roof of the balcony to my front door, standing in alert attitude, with outstretched neck, a Grouse.

So perfect was the bird in form and plumage that I could not think it had passed through the hands of a taxidermist; so motionless was it that I was doubtful whether it was really alive. My attention was called off for a few moments, and the bird seized the opportunity to fly away. How can I account for its presence? In this way:

Behind my house ran the creek which surrounds the City of Hull, and beyond it were the beautiful grounds of Mrs. Ellery Lord and Front Street. Then came the meadows (including the well-known "Beaver Meadow") and strips of woodland. Surveyors and axe-men had just commenced to convert the Beaver Meadow into town lots. Their operations probably had disturbed the grouse, and a succession of alarms had kept it on the wing till it whirled round the street corner near my house and took refuge in the greenery on the balcony. This, of course, is supposition.

One of our most welcome summer visitors is the robin. When friends meet, a frequent greeting in the end of April or beginning of May, is "Good morning! Did you hear the Robin?" What accounts for the popularity of the bird? (1) Its hearty morning call is a pleasant sound. (2) It is a trim, handsome bird, that adorns our city grass plants. (3) It is a sociable bird and loves to build its nest on or near our dwellings. (4) It is a cleanly bird and makes no litter in building, and keeps its nest and its surroundings unsullied. Its confidence in man wins man's protection.

A friend in Hull has under the veranda of his house a preserved head of a Virginia Deer. Between the horns of this, in the year 1909, a pair of robins built their nest and reared their brood. The same pair (it is thought) returned to it the next season and were again successful and raised their young.

It was interesting to watch the approach of a parent bird to the nest. It would alight on a branch of a cedar tree that grew at the end of the veranda and look around. If only members of the household were near it would come on at once. If a stranger were present it would pause, as if to judge of his disposition, before making its approach.

Of quadrupeds, perhaps the most remarkable I have seen in a Canadian city is the Black Rat (*Mus rattus*). The specimen I found was a dead one. I had occasion one day to go to the Louise Embankment, Quebec City, and while walking along one of its wharves I found the body of the little beast I speak of (I am sorry that I did not have it preserved). The creature had probably landed from a vessel from Europe, and been set upon and killed by the Brown Rats with which the Embankment abounds.

The Black Rat, in olden times, was the common rat of England, and it was plentiful enough. Its enemy, the Brown or Norway Rat (*Mus decumanus*) found its way to that country about the period of the English revolution, and the Jacobites called it the *Hanover* rat, very much in the same spirit that *Cecidomyia destructor*

was called in America the *Hessian* fly. The Black Rat is a great rarity in England now.

The Flying Squirrels are interesting little animals. I purchased a pair of them in Bonsecour Market, Montreal, from a farmer's boy. This was in 1863. I carried the little creatures home and they became great pets. They slept curled up in their snuggery most of the day, but at dusk they became very lively. We were accustomed to open their cage door and let them have the run of two adjoining rooms. They would leap from piece to piece of the furniture in the rooms, and from picture to picture on the walls, and have a grand chase and frolic. When tired they would go back to their cage of their own accord. Unfortunately, one evening, our maid left a window open in the outer room, and our pets bounded through it and we saw them again no more.

Seals sometimes come up the St. Lawrence as far as Montreal. On the 23rd of April, 1863, I travelled to Laprairie. My business accomplished I hired a French Canadian and his son to row me back to the city in their canoe. The weather was delightful and the water calm. Masses of ice were floating about and wild ducks were flitting near. When we were drawing nigh the city a round head suddenly rose from the water not far away. "*Sacrè!*" cried my old boatman "*Un veau marin! Un veau marin!*" Then breaking into English for the benefit of his passenger, "She am worth five *ou* six dollare. *Helas*, me gun she gone home!" Presently we saw another head. *Two* seals, attracted, the old man said, by his red shirt, were following us. We had their company for nearly a mile.

I have said enough, I trust, to remind you that, to those who have eyes to see, nature affords tokens of her presence, even in the busy haunts of men.

Dr. Hewitt: I think we should send Dr. Fyles the greetings of the Society, and also its thanks for the paper that he has contributed this afternoon. Dr. Fyles has always been present at every meeting of the Society that he could possibly attend. He has become so infirm now that he cannot move from his home at times, and therefore I think it is only right for us to send Dr. Fyles our greetings and thanks for the paper.

Mr. Winn: In Dr. Fyles' paper mention is made of the emergence of the Cicada. It has often been stated that the Cicada comes out early in the morning, but how long it takes to dry its wings is a matter of dispute.

Capt. Spencer: This summer I watched a Cicada emerge later than two o'clock in the afternoon at Camp Borden. It crawled out of the ground, left its case, and its wings were hard enough to fly a short distance (two or three feet) within half an hour.

DUSTING FRUIT TREES AND GRAPES FOR THE CONTROL OF DISEASES AND BITING INSECTS.

L. Caesar, O. A. College, Guelph.

The success of the Cornell experiments with the so-called "Dust Spray" aroused much interest in Ontario as well as elsewhere, and led to our performing a series of tests with this new method of controlling biting insects and diseases. All these experiments were conducted in the Niagara District, because I considered this not only the most convenient place, but also the district most infested with Codling Moth.

Composition of the Substance Used in Dusting.

In all my tests where both insects and diseases were to be combated, I used a mixture composed of 85 per cent very finely ground sulphur and 15 per cent. arsenate of lead powder, supplied ready mixed by The Niagara Brand Spray Co., Burlington. The price of the mixture was $6.50 per 100 lbs. When biting insects were not present, as on grapes, and on plums in the later sprayings, the arsenate of lead was omitted and finely ground sulphur alone used. This reduced the cost greatly as the sulphur alone cost only $2.90 per 100 lbs. Some persons used the sulphur mixed with finely ground limestone.

Outfit for Applying the Dust.

I had the larger type of dusting outfit supplied by the Niagara Brand Spray Co. They have a smaller outfit, but it cannot cover nearly so may trees. The outfit consists of a 2½ horse-power gasoline engine, a blower and a receptacle or

Dusting fruit trees for insects and diseases.

hopper capable of holding about 100 lbs. of the dust. The dust is blown out upon the trees through a galvanized iron pipe of about 3 inches diameter. This pipe is connected wth the blast passage by a thick rubber tube of the same diameter. The flexibility of the rubber allows the operator to direct the pipe in any direction quickly and easily. For small trees a short pipe about 3 feet long is used, but for large trees the pipe must be longer. I used one about 6 feet in length. Too long a pipe is awkward as the branches interfere with it; too short will not throw the dust high enough. The amount of material used can be regulated by the operator by a small lever on the hopper. The outfit costs complete about $265.

Kinds of Weather Best Suited for Dusting.

Dusting should not be done in a strong wind, because this carries the material too rapidly through the air instead of allowing it to float slowly through the trees and settle thickly upon the foliage and fruit. A strong wind, moreover, will often

drive the dust down and not permit it to reach the top of the tree. The ideal condition is a perfectly calm day, or one with almost no breeze. The driver should go up and down the rows parallel with the wind so that the operator may shoot the spray into the trees at right angles to the row, thus finishing the whole orchard as he goes. It will not do to dust one side of the trees; both must be done just as in the case of the liquid spray; otherwise the results will not be satisfactory. Sometimes, especially at the Codling Moth spray, it is impossible to watch for an ideal day, and one has to spray with the wind. Then if it does not change soon, the remainder of the tree can be sprayed by blowing the dust in from each side at right angles to the wind. The spraying may be done in the morning or evening when the wind usually moderates.

It is just possible that grapes in the earlier dustings before the leaves are large and abundant could be dusted against the wind so that the dust would be blown back to the opposite side of the next row, in this way covering both sides and saving time and labor. This cannot be done, however, when the foliage is dense.

Dusting apparently may be done with safety either when the foliage is dry or moist.

Amount of Material Required Per Tree.

For very large apple trees requiring about 12 gals. per tree of liquid for the Codling Moth spray, I use an average of nearly 4 lbs., but found that 3 lbs. would, if properly applied, suffice. For an average size apple tree about 25 years of age, I should use at least 2 lbs. Plum, cherry and peach trees require anywhere from about ¼ to 2 lbs. per tree. It requires a good deal of careful watchfulness to determine how much to use. A careless man may use 100 lbs. in a few minutes, where one-quarter the amount would have been sufficient.

Need of Care in Applying the Dust.

I found that to cover either a large or small tree thoroughly with the minimum loss of material required much quickness of movement and constant watchfulness. It is no job for a lazy or an indifferent man. As a rule the best method was to move the outlet pipe up and down quickly, and not to drive so close to the tree that the branches would be in the way. This, however, often had to be varied for a sudden gust of wind from time to time would carry the dust away from the desired direction. This necessitated a different stroke to cover the missed area. Sometimes too, the branches were too close to spray them except by shooting the dust back quickly when the wagon had passed. One would be very tired after a hard day of careful dusting of large trees.

There is very little danger to the operator from the dust, but it is expedient to use goggles.

Comparison of Time Required for Dusting vs. the Usual Method of Spraying With a Power Machine.

The dusting method is very much quicker than the other method. It took me an average of 1½ hours to spray both sides of 92 very large apple trees. With a power outfit and liquid spray applying 960 gals. per day, it would have taken at least 12 hours to do the work as thoroughly. This means that on such trees the dust spray was eight times the more rapid. On smaller trees, such as plums or cherries, which with a liquid outfit may be well sprayed as the horses move slowly

but continuously along, the advantage in saving of time would not be great were it not that it takes a good while to fill up the tank with liquid, whereas it requires only a minute or two to fill the hopper with dust. On these small trees the dust method would probably be from two to four times as rapid as the liquid.

Comparison of Cost on Large Trees.

The following data for the large apple trees sprayed by us give what I believe to be a fairly accurate estimate of the cost of each kind of spraying where there are no delays of any kind, and where both outfits are working well in every way.

Cost of Dusting 92 Large Apple Trees Using 3 lbs. per Tree.

92 large apple trees at 3 lbs. each = 276 lbs. material at 6½c.	$17.94
Gasoline at 35c. per gal.	.15
Oil	.04
2 men at 20c. per hour, for 1½ hours	.60
1 team at 30c. per hour, for 1½ hours	.45
Total cost for 92 trees	$19.18
Average cost per tree	20.8c.

Cost of Spraying 51 Large Trees with Lime-Sulphur and Arsenate of Lead.

612 gals. dilute lime-sulphur (strength 1.008 sp. gr) = 16½ gals. commercial lime-sulphur at 15c. a gal.	$2 46
30½ lbs. arsenate of lead at 11c.	3 36
Gasoline	60
Oil	15
3 men for 6⅜ hours at 20c.	3 82
1 team for 6⅜ hours at 30c.	1 91
Total cost for 51 trees	$12 30
Average cost per tree	24.1c.
Average cost for dusting	20.8c.
Balance per tree in favour of dust	3.3c.

COMPARISON OF COST ON LARGE, SWEET CHERRY TREES.

Cost of Dusting 55 Large Trees.

100 lbs. dust at 6½c. per lb.	$6 50
Gasoline	05
Oil	20
2 men ½ hour at 20c.	20
1 team ½ hour at 30c.	15
Total cost of 55 trees	$6 92
Average cost per tree	12.6c.

Cost of Spraying 45 Trees with Lime-Sulphur and Arsenate of Lead.

160 gals. lime-sulphur (strength 1.008) = approximately 4⅓ gals. commercial lime-sulphur at 15c.	$0 65
10 lbs. arsenate of lead at 11c.	1 10
3 men, 1½ hours at 20c.	90
1 team, 1½ hours at 30c.	45
Gasoline	15
Oil	05
Total cost for 45 trees	$3 30
Average cost per tree	7.3c.
Average cost for dust per tree	12.6c.
Balance in favour of liquid per tree	5.3c.

The balance in favour of the liquid would be still greater on small trees taking less material. If, however, the arsenate of lead were omitted the dust price would fall from 12.6c to 6c and the liquid from 7.3c to 5c, leaving the liquid still the cheaper.

One must not forget that all the above figures are based on the assumption that the outfit used for the liquid spray was a power one, applying 960 gals. per day of 10 hours, whereas many of our fruit-growers still use the hand pumps, which take double the amount of time, and would thus increase the cost in comparison with the dusting, though the initial difference in price of the two outfits would offset much of this.

Experiments on Large Apple Trees.

The orchard chosen for the experiments consisted of 162 very large trees almost any one of which was capable of bearing 10 barrels and upwards of fruit. The varieties were Baldwin, Greening, Golden Russet, Spy, Yellow Harvest, Astrachan, Gravenstein and Twenty-ounce Pippin. The orchard was in a neglected condition, and had not been sprayed for years. All the trees were infested with San José Scale, some of them badly. Codling Moth abounded in this and other unsprayed or poorly sprayed orchards of the district, and as the trees extended up to the base of the so-called Mountain, which was covered with uncared for apple, pear, plum and cherry trees, and also with many shrubs and weeds, the Plum Curculio was more abundant here than in most orchards. The leaves on the ground in spring, as examined by Prof. Howitt and myself, showed great numbers of the perithecia of the Apple Scab fungus.

Before the spraying, the owner of the orchard pruned the trees moderately well, and scraped off the rough bark. Then in order to give the different substances used a fair chance, we sprayed the whole orchard heavily for San José Scale with lime-sulphur, strength 1.035 except that soluble sulphur was used on 19 trees (strength 12½ lbs. to 40 gals.). About half the dust plot was sprayed for scale before the buds began to burst, the remainder and most of the liquid plots as or just after the buds burst. Buds began to open May 2nd. All plots were finished by May 5th. The spraying for the scale gave satisfactory results on all except six trees which, owing to their situation, could not be thoroughly treated. Out of the total of 162 trees, 92 which formed a block by themselves east of the house were chosen for the dust test, and the remaining 70 were used for the liquid sprays. Of these 70 we chose four central rows containing the 19 trees mentioned above for a comparative test with soluble sulphur and calcium arsenate. The rest (51 trees) were treated with lime-sulphur and paste arsenate of lead.

The Dusted Plot (92 trees).

The trees were each dusted twice, the work being thoroughly done on both occasions. On August 22nd, 61 trees were redusted on one side only, but as this partial application had no visible effect on the trees compared with the remainder either upon insects or diseases, it need not be considered.

The first dust application was just as the blossom buds were ready to burst, May 19th and 20th. I delayed it just as long as I could and until a few blossoms had actually opened. The dust, therefore, had an excellent opportunity to get on the base or receptacle of the blossom and protect it against early infection with Scab.

The second application was soon after the blossoms fell. One side of the trees was dusted June 3rd, the other June 6th. The calyces were beginning to close at the latter date, but were not too far advanced for best results.

The Lime-Sulphur and Arsenate of Lead Plot (51 trees).

The first application after the leaves opened was, as in the case of the dust, given just before the blossoms opened, one side of the trees being done on May 15th, and the other on May 20th. The lime-sulphur was used at the strength of 1.010 sp. gr. and the arsenate of lead (paste) at 2½ lbs. to 40 gals. of diluted lime-sulphur.

The second application was given soon after the blossoms fell, one side of the trees being done on June 1st, the other on June 3rd. The lime-sulphur was used at the strength of 1.008 sp. gr. and the arsenate of lead (paste) at 2 lbs. to 40 gals. of diluted lime-sulphur.

The Soluble-Sulphur and Calcium Arsenate Plot (19 trees).

The first application was just before the blossoms burst, one side May 17th, the other May 20th. Soluble-sulphur 1½ lbs. and calcium arsenate (powder) 1-2/3 lbs. to 40 gals. of water were used.

The second application was just after the blossoms fell, on June 3rd, both sides being sprayed the same day. The soluble-sulphur was used at 1¼ lbs. and calcium arsenate at 1⅔ lbs. to 40 gals. of water.

Note.—In each plot it will be observed that including the early application for San José Scale, only three sprayings were given, except that in the dust plot 61 trees were dusted from only one side in August.

Treatment of Soil on the Plots.

No part of the orchard received any fertilizer. The dusted part had rich soil and was left in sod, in fact two cows pastured on it for a couple of weeks while the apples were small. Later the weeds were mown down. The liquid sprayed part had poorer soil, hence the owner on our advice ploughed and cultivated it to give the trees a fair chance.

Check Trees.

As check trees we relied upon the uncared for trees on the mountain side, on neighboring orchards and on a row of ten trees consisting of R. I. Greening, Baldwin, Spy and Gravenstein, belonging to a neighbor, and in the same relative position to the mountain as our own orchard. These ten trees we dusted before the buds burst with soluble-sulphur dust and hydrated lime to see the effect upon San José Scale. Somewhat unfortunately for us, perhaps, the owner seeing the excellent amount of bloom gave the trees a moderate spraying with lime-sulphur and arsenate of lead soon after the blossoms fell.

Results.

1. *Effect on the Foliage.*—We may mention here that on neither apples, cherries, plums, peaches nor grapes did the dust, so far as we could judge, cause any burning or injury. On the apple trees the dusted leaves were much superior to those on the liquid sprayed plots, being more glossy and more perfectly expanded than those that were sprayed with lime-sulphur and arsenate of lead. The soluble-

sulphur and calcium arsenate burned the foliage very severely, causing fully half of the leaves to drop and leaving dead spots on most of the remainder.

2. *Effect on Apple Scab.*—On each of the plots apple scab was well controlled. The liquid sprayed parts were a little better than the dusted, but not much. There is no doubt that fully 99 per cent. of the fruit in the lime-sulphur and arsenate of lead plot was free from scab. The soluble-sulphur and calcium arsenate plot gave at least 98 per cent. free and the dusted part averaged as nearly as we could judge 97 per cent., though one Greening tree situated at the extreme north-east corner where it was difficult to dust it thoroughly had about 10 per cent. scab, and a Spy tree possibly 8 per cent. A count at picking time of 1,500 apples on a dusted Yellow Harvest, a variety very subject to scab, gave 51 scabby apples, or 3.4 per cent., leaving 96.6 per cent. free of scab. A count of 400 Red Astrachans, nearly all there were, gave 12 scabby = 4 per cent., leaving 96 per cent. clean.

Neither my assistant nor I could be present at picking time owing to College duties, but we examined carefully at the end of August every Baldwin, Greening, Russet and Spy tree that had fruit on it on all the plots, and made a note of the number of scabby fruits on each. No further development of scab has taken place since. The results are shown in the following table.

TABLE SHOWING THE NUMBER OF SCABBY FRUITS AS SEEN ON THE TREES AT THE END OF AUGUST.

Variety	No. of Trees	Mixture used	No. of Scabby Fruits
R. I. Greening.....	12	Dust.....	120 (55 of these on one tree)
" "	12	Li-sul and arsenate of lead	10
" "	10	Sol-sul and calcium arsenate	38
Baldwin.....	61	Dust	102
"	10	Sol-sul and arsenate of lead	1
"	6	Sol-sul and calcium arsenate	3
Golden Russet	3	Dust.....	4
" "	2	Li-sul and arsenate of lead	1
" "	2	Sol-sul and calcium arsenate	2
Spy	1	Dust.....	50
"	Part of 1 tree a graft	Li-sul and arsenate of lead	0

These figures do not of course represent the total number of scabby fruit, but we believe that they do represent at least half the total number. Since writing the above Mr. W. E. Biggar, the Provincial Fruit Pests Inspector, has counted many bushels of the dusted fruit picked from various trees and corroborates my estimate of the percentage of clean fruit. The dusted part of the orchard I estimated to have over 300 barrels of a crop, the other about 85. Some trees were heavily loaded, others very lightly.

Checks.—On the mountain side Baldwin trees averaged approximately 50 per cent. scabby fruit, Golden Russets approximately 10 per cent. There were no Greenings or Spys. On the row of ten trees on the adjoining farm, where the trees

received the Codling Moth spray, but not the one just before bloom, the Greenings and Spys averaged from 25 to 30 per cent. scabby fruit, and the Gravenstein 50 per cent. or upwards, while a heavily loaded Gravenstein in the dusted plot averaged 5 per cent. scab, but it should be mentioned that this tree, owing to its blooming earlier than the other trees of the orchard, had been sprayed with lime-sulphur three days before it was dusted. (The dust had not arrived yet).

An examination of many trees throughout the district led us to estimate that in general unsprayed Spy trees were about 60 per cent. infested with Scab, Greenings and Baldwins about 40 per cent. These figures show that in spite of the wet season, the scab fungus was not specially abundant in the Grimsby district, and therefore much better results were obtained by spraying there than would likely have been obtained in almost any other part of the Province. The average unsprayed orchard elsewhere would show 95 per cent. of scabby apples.

Another view of the dusting machine at work.

What has been said shows that dusting as done by me under Grimsby weather conditions, gave satisfactory results on Apple Scab, but I fear I could not have obtained nearly so good results in most, or perhaps, in any other part of the Province. Mr. Kydd, of the Fruit Branch, Toronto, who is just as thorough an experimenter as I am, did not secure nearly so good results from the dust spray as from the lime-sulphur liquid spray. The contrast is a striking one.

TABLE SHOWING RESULTS OBTAINED BY MR. W. F. KYDD.

Place	Variety	Mixture used	No. of applications	Scab-free Apples
Paris.....	Spy	Lime-sulphur and arsenate of lead.....	4	95
"	"	Dust (sulphur and arsenate of lead, powder)	4	28
Wellington	"	Lime-sulphur and arsenate of lead.....	4	83
"	"	Dust (sulphur and arsenate of lead, powder)	4	24

The unsatisfactory results obtained by Mr. Kydd and, as I am informed, by many other men in the United States, show that it would be very unwise to recommend unreservedly the dust spray as a substitute for the lime-sulphur and arsenate of lead.

As weather conditions are the chief factors determining the amount of scab, I have inserted here the weather record from April 23rd to June 25th, during which time all the scab infection of the season took place.

		A.M.	P.M.	Temperatures		
				Maximum	Minimum	Precp'n.
April	23	Dull	Slight rain, dull	49	39	
	24	Cloudy	Sunny and warmer	51	40	¾"
	25	Cloudy	Cloudy, with little rain towards night	51	42	
	26	Dull to clearing	Bright, distant thunder	57	41	
	27	Fairly bright	Mostly bright, turning colder	52	42	
	28	Early fog to 8 a.m., bright	Warm and bright	59	39	
	29	Beautiful and bright.	Sunny and warm	60	42	
	30	Bright and pleasant	Mostly bright with few clouds	71	42	
May	1	Cloudy, with small amount of fog	Bright and windy, S.-W., light showers at night	72	45	
	2	Bright and cool	Mostly bright, North breeze, apple leaf buds beginning to open	72	39	.10
	3	Rain and cool, N.	Dull, very little rain and cool	72	37	.35
	4	Bright and fair	Bright, W.	72	41	
	5	Early morning bright, cloudy about 9 a.m., Strong S. winds	Some clouds	72	47	
	6	Fairly bright, few clouds	Some clouds, but sunny at times	72	42	.20
	7	Fine, warm and clear.	Fine, warm and clear.	72.5	30	
	8	Rain, clearing at 10 a.m.	Bright and breezy	70	43	.19
	9	Bright and cool, W.	Bright, breezy, cool, W.	61	44	
	10	Rain until 12 a.m.	Very little rain, mostly cloudy	70	45	.23
	11	Bright and breezy	Bright and very windy, W.	68	29	
	12	Bright and cool	Bright, breezy and slightly cool.	59	41	
	13	Bright, cool breeze, E.	Bright and warm	66	37	
	14	Dull and cool	Rain all p.m.	65	43	.22
	15	Rain 5 to 8 a.m., turning brighter	Dull, misty, damp	50	41	.97
	16	Very light showers in early morning	Rain all p.m., moderately heavy	56	43	.14
	17	Cold, cloudy and damp,	Cloudy, colder and windy	56	45	.07
	18	Cloudy, windy & chilly.	Cloudy, windy & chilly	55	40	
	19	Cleared about 8 a.m.	Clear	62	40	.11
	20	Bright and fairly warm	Bright and fairly warm	60	38	
	21	Bright and fairly warm	Bright, turning cloudy.	60	39	

		A.M.	P.M.	Temperatures		
				Maximum	Minimum	Precp'n.
	22	Rain	Rain	58	43	.44
	23	Dull till 9 a.m.	Clear and warm	75	45	.13
	24	Clear and warm	Clear and warm	78	49	
	25	Warm, few clouds	Warm, few clouds	72	56	
	26	Bright and warm	Bright and warm	63	46	
	27	Heavy thunderstorm, 5 to 8 a.m.	mostly cloudy	62	44	.42
	28	Bright and clear	Bright and clear	76	46	
	29	Bright and clear	Bright and clear, began to rain at 6 p.m.	60	51	
	30	Heavy rain during night, cloudy	Mostly hot and bright.	62	51	1.36
	31	Clear and cool	Clear and cool	64	45	
June	1	Clear and fine	Clear and fine	65	41	
	2	Rain at 10 a.m.	Rain, heavy	69	44	1.43
	3	Clearing	Fine	68	51.5	.10
	4	Bright	Mostly bright	70	51	
	5	Bright	Bright	70	54	.16
	6	Fair	Fair, E.	61	47	
	7	Cloudy	Heavy rain	64	48.5	.12
	8	Dull and cool	Rain and dull	61	52	.17
	9	Sunny	Dull with showers, rain at night	55	44	.53
	10	Cloudy	Dull	58.5	50	.01
	11	Fair	Fair	60	46	.03
	12	Clear and fine	Clear and fine	73	48	
	13	Clear and hot	Clear and hot	80	54	
	14	Clear and warm	Clear and warm	79	56	
	15	Rather dull	Rain 1.30 to 3.30 p.m.	72.5	60	.08
	16	Cloudy	Cloudy, cooler at night	66.5	50	
	17	Fine and warm	Fine and warm	70	50	
	18	Dull with some rain	Dull with some rain	62	56	.66
	19	Dull with some rain	Clearing	64	49	.29
	20	Cloudy and cool	Cloudy and cool	58	49	
	21	Rain, clearing at 11 a.m.	Clear	61.5	47	.16
	22	Bright	Bright	69	46	
	23	Fair	Fair	66	47	
	24	Fair	Heavy rain, 4 to 5 p.m.	65	56	.83
	25			68	55	
		Fine dry spell began here.				

3. *Effect on Leaf-Spot.*—Experiments performed by Mr. W. F. Kydd, of the Horticultural Branch, in an orchard at Wellington this year, showed that the dormant spray, or the spray as the buds are bursting, has much value in the control of leaf-spot, and hence in our plots the spray for the San José Scale doubtless helped. In the dusted parts we saw no leaf-spot. The lime-sulphur part was also almost entirely free, and any slight amount there was may have been due not to the fungus, but to burning by the mixture. On the soluble-sulphur and calcium arsenate plot, the spray injury was so great as to make it impossible to determine anything about this disease. On unsprayed trees there was a considerable amount of leaf-spot, but we did not estimate the percentage, as this disease is not of much importance in Ontario.

4. *Codling Moth.*—On all the plots the Codling Moth was well controlled, especially when we consider that the orchard had been neglected for several years. Only two apples in the whole orchard were found in which the worms had entered

the calyx end. There were a number of side worms, but not so many as we expected. My estimate made the first week in October for the total of the fruit both on the trees and the ground was that it ran somewhere between 5 and 10 per cent., with an average of probably 8 per cent. There was very little difference between the different plots.

Check trees and poorly sprayed orchards nearby varied from 30 per cent. to 80 per cent. wormy with about 75 per cent. of these entering at the calyx end. It is quite clear, therefore, that the dusting will control the Codling Moth satisfactorily.

5. *The Plum Curculio.*—With the exception of one or two rows of trees bordering upon the mountain, and in some thickets along one side of the dusted part of the orchard Curculio injuries were scarce. Even on the worst infested trees much fewer apples dropped or were deformed than I had expected. The vigorous condition of the trees may have had something to do with this. The liquid sprayed part was freest from Curculio injuries, but owing to a difference in surroundings it is impossible to determine whether the spraying was the cause. The check trees were much worse infested, but in most cases their surroundings were more favorable for these insects.

6. *Other Biting Insects.*—All the plots were to some extent infested with Fall Cankerworms, Bud-moth, Case-bearers and Lesser Apple-worms. The percentage of these killed could not with the time at our disposal be determined; there was, however, not much difference in the amount of injury done in the various plots.

Results on Sweet Cherries, Plums, Peaches and Grapes.

As very few of the members of our Society, or of the others present are specially interested in plant diseases, I shall not go into details of the experiments with the dust on plums, peaches, cherries and grapes, but merely state that on sweet cherries, which are much more subject to rot than sour, the dust spray gave about equally as good results as either lime-sulphur or Bordeaux mixture, and that all these plots were much cleaner than the check. On plums (Lombard variety) the rot was controlled. On the checks of the same variety there was considerable rot. On peaches there was so little rot even on the unsprayed trees that no conclusions could be drawn.

On Roger varieties of grapes, which are of course specially subject to Powdery Mildew, this disease was thoroughly controlled, whereas on checks there was considerable of the disease both on the leaves and berries. The season was, however, not specially favorable for Mildew, and there was almost no Black Rot.

Conclusions.

My results with the dust spray apply only to Grimsby district and Grimsby weather conditions. I have some doubt whether in other districts with the closest study of the weather and a good knowledge of the life history of the apple scab fungus, I could have so chosen the dates and numbers of application as to control the scab on apples. It is certain that in some places the ordinary recommendations would have had to be modified.

A great drawback to the dust method is that we have not yet found a really satisfactory powder that will control scale insects or other sucking insects. Finely ground soluble-sulphur mixed with hydrated lime gave me fairly good results on San José Scale, but there is almost sure to be trouble with this mixture, because of its tendency to absorb moisture and then harden, thus clogging the slit in the

hopper and the blast passage. It seems necessary also to apply it to the trees when they are moist. Another defect is that the dust does not adhere nearly so well as the liquid lime-sulphur especially on glossy fruits and foliage. This is somewhat counteracted by the fact that one can use the dust on fruit a short time before picking without fear of staining, but cannot do this with the liquid.

I believe that some tests on Pear Psylla at Burlington, probably with hydrated lime, have proved successful.

I am also told that some tests in New York, possibly with tobacco dust, promise well against aphids.

Should the hopes of the advocates of the dusting method of spraying be realized we can see a great field of usefulness for it not only on fruit trees, especially large fruit trees, but also on valuable shade trees in cities and parks. It should be a great boon in the control of the Elm Leaf-beetle, Tussock Moth, Tent Caterpillars, and many other biting insects. Leaf diseases on shade trees could also in some cases be controlled. I believe it has already been tested on the Leaf-spot or Leaf-blight of the horse chestnut.

It should not be at all difficult to improve the outfit so that even the tallest trees could easily be reached.

FATHER LEOPOLD: May I ask Prof. Caesar what is the cost of your spraying outfit, that is, for the blower alone?

PROF. CAESAR: The total cost for engine, blower and hopper was $260; it will be a little higher this next year, probably $275. Probably $150 or $140 would be the price for the blower and the hopper; I think you could get the engine for about $100.

A MEMBER: What horse-power engine did you use?

PROF. CAESAR: Two and one-half horse-power.

PROF. BRITTAIN: Did you have anyone here contract lead poisoning from the use of that dust mixture?

PROF. CAESAR: There would be a possibility of injury from the dust if you were reckless and tried to spray against the breeze, but the spraying should always be done, if possible, on a calm day, and you should spray at right angles to any little wind there may be.

PROF. BRITTAIN: I have been told of one experimenter who contracted a very bad case of lead poisoning from using the dust spray.

PROF. CAESAR: I sprayed a good many days this year, and I consider that the danger from the dust amounts to practically nothing both to the eyes and to the lungs. I should say, however, that I wore goggles part of the time.

PROF. BRITTAIN: I should think that the great weakness with this dust spray would be that it does not control sucking insects successfully. Where scale insects and sucking insects like Capsids are very abundant, that would be a very serious drawback.

PROF. CAESAR: In a large part of Ontario we do not need to spray for Aphids and our Capsids, though they are bad in a few orchards, are very seldom bad enough to necessitate spraying for them.

MR. DEARNESS: I understood Prof. Caesar to say that the spraying for Scab was done at an exceptionally favourable time, and I wish to ask what time that was.

PROF. CAESAR: The Apple Scab is of course one of the interesting things from the standpoint of plant pathology. I found in our experiments—and I have been spraying for Apple Scab for eight years—that the great danger period for Apple Scab is either the period from the time the blossoms begin to burst on to

the time when the apples are about the size of a good marble (about half an inch in diameter), or from about the middle of August to the time of picking. The first period I have mentioned you will find will be the one for about five seasons out of six. I have never sprayed more than three times. If you have your orchard perfectly clean for the first period, it takes a long time for the scab fungus to become abundant again that year.

Mr. Dearness: In regard to the scattering of the summer spores, do you find this to be about the first of July? This fungus has its first period of infection, of course, directly from the over-wintering spores.

Prof. Caesar: I may say in regard to the times of infection that the first infection comes on the leaves nearly always, and it comes from the ascospores on the leaves on the ground. As soon as those develop to fructification —which is in about two weeks usually—you have then what you call the summer spores. You can never be sure of the date; it depends upon the weather conditions.

Mr. Biggar: Has the dormant spray anything to do with the control of Scab?

Prof. Caesar: Some seasons it has, and I think probably in our case it had because we gave a very heavy application for San José Scale, and everything on the ground was drenched.

GENERAL NOTES ON APHIDES WHICH OCCUR ON APPLE TREES.

William A. Ross, Vineland Station.

The purpose of this paper is to present brief notes on ten species of aphides which have been taken on the apple in Ontario. Four of the insects, viz., *Aphis pomi, Aphis malifoliæ, Aphis avenæ* and *Eriosoma lanigera*, are noxious; the others, viz: *Aphis bakeri, Aphis brevis, Aphis* sp. (near *gossypii*), *Macrosiphum solanifolii, Myzus persicæ* and *Macrosiphum pelargonii* (?) are, so far as our observations have gone, of little or no economic importance.

The Green Apple Aphis (*Aphis pomi* De Geer). This species is the most troublesome plant-louse with which Ontario orchardists and nurserymen have to contend. It attacks, curls and sometimes kills the foliage, and in cases of severe infestation, it may even feed on the fruit. It has a very pronounced predilection for succulent shoots and water sprouts, and in fact, if not provided with these delicacies, it will not thrive and multiply rapidly. The aphis produces a generous supply of honey-dew, and because of this it is well patronized by ants. The black fungus which develops in this honey-dew gives the foliage, twigs and sometimes the fruit of an infested tree a sooty and very unsightly appearance.

The eggs of *Aphis pomi* hatch in April when the buds of apple trees are swelling and commencing to burst. The stem-mothers, *i.e.*, the aphides which hatch from the eggs, reach maturity, and commence reproducing in somewhat less than three weeks. During the next month or so each female which survives all the perils to which plant-lice are subject, gives birth on an average to 70 young (74 was the average obtained from 18 individuals in our 1915 experiments). The progeny of the stem-mothers for the most part develop in from two to three weeks into apterous viviparæ. A number of this generation, however, and a still larger number of the third generation become alate and migrate to other apple trees. The third generation is succeeded by brood after brood of wingless and winged viviparæ until by the close of the season as many as fourteen or fifteen generations

may have arisen. In the fall, apterous oviparæ and apterous males put in an appearance. The sexes mate and the females deposit their eggs on twigs and water sprouts.

The Rosy Apple Aphis (*Aphis malifoliæ* Fitch). Like many another rogue, this insect has been living amongst us under a false name. In a recent letter, Mr. A. C. Baker, of the U. S. Bureau of Entomology, informs me that its correct appellation is *Aphis malifoliæ* Fitch, and not *A. sorbi,* nor yet the more recent *A. kochii.* It appears that Kaltenbach's *A. sorbi* from Sorbus and Schouteden's *kochii* (*pyri* Koch) from apple are quite distinct from our rosy aphis.

This species is often very destructive in apple orchards. It has a marked preference for, and confines its work largely to the lower, inner and shady portions of the trees. It not only curls and destroys foliage, but by feeding on the leaves adjacent to fruit clusters, and on the fruit itself, it produces bunches of deformed, dwarfed and unmarketable apples. The rosy aphis is essentially a pest of the bearing orchard. So far as our observations have gone, it seldom occurs on, and is never injurious to nursery stock. This partial immunity is largely due, I think, to the fact that young trees do not afford the aphis—a shade loving insect—suitable shady quarters.

The eggs of this species hatch about the same time as those of *Aphis pomi.* The stem-mothers become mature in twenty days or so, and begin to give birth to young at an alarming rate. According to our 1915 experiments each female may produce from 67 to 260 young (data obtained from 12 individuals). The second generation resemble their mothers to a great extent in rate of development, in fecundity and in the absence of wings. During a period extending from mid-June to the latter part of July, the third generation lice acquire wings and migrate to and establish colonies on *Plantago lanceolata,* and *P. major,* chiefly the former. (It should be mentioned here that a small percentage of the migrants may belong to the second and fourth generations). On the secondary food plants, the aphides breed rapidly, and as many as eleven broods may arise. In the autumn alate sexuparæ and alate males appear and fly back to the apple. The sexuparæ give birth to young, which in three or four weeks' time became mature apterous oviparæ. After being fertilized by the males the oviparæ lay their eggs on twigs and branches—in crevices and around the base of buds.

The Oat Aphis (*Aphis avenæ* Fabricius). In the spring, this aphid, as a general rule, is much more abundant than the two preceding species, but as it only remains on the apple for a comparatively short time, it is not so injurious as they are. It attacks the foliage, the blossom stems, and sometimes the petals.

The eggs of the oat aphis commence to hatch several days before those of *Aphis pomi* and *Aphis malifoliæ.* The stem-mothers develop rapidly, and most of them are mature and are reproducing by the time the apple blossoms are showing pink. In the matter of reproductive capacity, they are very much like the stem-mothers of *A. pomi*—each female may give birth on an average to 76 young (average obtained from 9 individuals, 1915 experiments). The majority of the second and the whole of the third generation become alate, and during a period extending from mid-May to mid-June, migrate to their summer food plants—various grains and grasses. On these hosts, the aphides feed and breed until fall, at which time the return migration to apple takes place. As in the case of *malifoliæ,* the males are produced on the secondary, and the sexual females on the primary host.

The Woolly Aphis of the Apple (*Eriosoma lanigera* Hausmann). This cosmopolitan bark-feeding aphid is a very destructive apple pest in certain countries,

e.g., The United States, South Africa and England; however, in Ontario, fortunately for everyone concerned, it is only of minor importance. It is present in all our apple growing sections—on orchard and nursery tree, but it is seldom abundant and injurious enough to cause any alarm, or to warrant the adoption of remedial measures.

During the summer, colonies of flocculent apterous viviparæ occur on the twigs and water sprouts and around pruning wounds on the limbs and trunk. Rarely the lice are also found feeding on the roots of nursery stock, where they cause the formation of knotty enlargements. (Personally, I have never found the root-inhabiting aphides in Ontario. Nurserymen, however, inform me that they occasionally see them.) In September, alate forms appear and, according to Dr. E. Patch, of Maine, migrate to the American Elm, where they give birth to the sexes—minute wingless creatures. After mating, the females lay their eggs in crevices on the bark. The migration back to apple takes place in June of the following year.

The Clover Aphis (*Aphis bakeri* Cowan). This plant-louse does not appear to be common in Ontario. Personally, I have only taken it thrice on apple. In Colorado, however, *A. bakeri*, according to Gillette and Taylor, "ranks next to the green apple aphis in numbers as a leaf infesting species of the apple."

As the name suggests, the clover aphis migrates from apple to clover.

Ontario collections: Migrants—Arkona, 6.10.16; Migrants and young—Vineland, 14.10.16 and 17.10.16.

The Long-beaked Clover Aphis (*Aphis brevis* Sanderson). This insect is essentially a hawthorn species, and it only occasionally occurs on apple. I have made but three collections of it from the latter host.

Like the preceding species, it spends the summer on clovers.

Ontario collections: Migrants and males—Vineland 3.11.15; Males—Arkona, 6.10.16; Migrants, males and immature oviparæ, Vineland 17.10.16.

Aphis sp. (*near gossypii*). In June, 1915, Mr. Howard Curran, my assistant, collected specimens of an unfamiliar, pale green aphid from an old apple tree growing on the O.A.C. campus at Guelph. According to Mr. Curran, the plant-louse was quite abundant at the time the collection was made.

This aphid is either a new species closely allied to *Aphis gossypii*, or it is a variety of the melon aphis. It differs from typical *A. gossypii* in having sensoria on antennal joint IV and sometimes on V, but whether this difference is of specific value I am at present not prepared to say. Only a careful study of the antennal variations of *A. gossypii* from different hosts will settle this point.

The following table affords a comparison between *Aphis* sp. and *Aphis gossypii* in the matter of antennal sensoria, and it likewise indicates the variability of the melon aphis.

Laboratory No.	Aphid	Sensoria on III	Sensoria on IV	Sensoria on V
6287.1.....	Aphis sp.....	7–11	3–6	0-2 and the sub-apical
——	Aphis gossypii as described by Pergande	5–7	None	Sub-apical
6287.4.....	Aphis gossypii from cucumber	5–8	None	Sub-apical
6305.....	Aphis gossypii from begonia.....	6–8	0–1	Sub-apical
6294.3.....	Aphis gossypii bred on apple	7–10	0–2	Sub-apical
6405.....	Aphis gossypii bred on apple	8–11	0–2	Sub-apical

The Potato Aphis (*Macrosiphum solanifolii* Ashmead). Dr. E. Patch points out in her recent publication on the Pink and Green Aphis of the Potato, that this insect has a very varied dietary ranging from grasses to composites. In view of this, it is not at all surprising that the aphid sometimes feeds on the apple. I have two Ontario collections of it from this host. Mr. A. C. Baker, of the U. S. Bureau of Entomology, also records its occurrence on apple at Washington, D.C.

Ontario collections: Alatæ, apterous viviparæ and nymphs—Guelph, 20.6.15; Alate form—Vineland, Ont., 3.6.16.

The Peach Aphis (*Myzus persicæ* Sulzer). This very common general feeder has frequently been found feeding on apple seedlings growing in the Horticultural Experimental Station greenhouses at Vineland Station, Ont. Fall migrants and their young have also been taken on orchard trees. (Vineland, 1916).

The Geranium Aphis (*Macrosiphum pelargonii* Kalt). (?) Small colonies of a large green *Macrosiphum* were frequently found this spring on some seedling apples which we had growing in our greenhouse insectary at Vineland.

I cannot be positive about the identity of this louse, but I think it is *Macrosphum pelargonii*. It differs from typical *pelargonii* in having the abdomen of the alate form ornamented with five transverse, broken, dark bands, but it is very questionable if this slight difference has any specific significance.

Prof. Brittain: The study of aphids in Nova Scotia has been only a minor problem with us. Our results have been very much the same as those of Mr. Ross, with the exception of course, of the differences due to climate. You have about 13 or 14 generations of *pomi;* we never have more than 8 or 9. As for *avenæ*, I never saw it until this year, when it appeared in rather large numbers. This spring I could not find a specimen of *pomi*, and if we had not kept eggs over from last year we would not have had any at all to work with. Late in the summer, however, winged forms began to appear in numbers and soon the insect was quite numerous. *Malifoliæ*, with us, also has 8 or 9 generations per year. The greater number of the 3rd generation are migrants. A small proportion, under certain conditions, remain wingless and continue breeding on the apple throughout the season, but their number is usually negligible.

In 1915 a number of those which we kept in the insectary breeding upon the apple became winged in the 7th generation. These winged forms were the true spring migrants, though it was September.

In each generation we transferred some young aphids from the plantains back to apples, and vice versa. Hundreds of such experiments gave negative results; but in one case young from an ordinary wingless female of the 3rd generation on the apple, came to maturity on the plantain and became typical plantain forms.

In studying the natural control of these aphids we found that click beetles preyed upon them and sometimes destroyed large numbers.

Dr. Howard: What species?

Prof. Brittain: *Dalopius lateralis.*

Prof. Caesar: This comes right down to the matter that a number of us are so much interested in, that is the control. Mr. Ross spoke about the different dates of eggs hatching of the different species, and I should like to ask him whether all the eggs of all the important species are hatched by the time the buds have begun to burst.

Mr. Ross: Judging from our results in the orchard the vast majority of the eggs hatch before the buds burst. This year we sprayed as usual just before the buds burst and while they were still compact, and we destroyed practically 100 per cent. of the aphids. As we did not see any aphids on the sprayed trees afterwards it led me to think that all or practically all the eggs had hatched before the buds burst. In our insectary experiments, however, the eggs still continued to hatch after the buds burst.

Prof. Brittain: I came across a very curious thing in British Columbia. I found a small number of aphids hatching when the snow was still on the ground in March, on days when the sun was hot. In Nova Scotia I have found them hatching outdoors until about the time the blossoms burst, though the vast majority of them, as Mr. Ross says, come out by the time the leaf buds burst.

Mr. Biggar: Can you control the aphids in the greenhouse by spraying?

Mr. Ross: Yes, by using a nicotine extract, either by fumigating or by spraying.

Prof. Caesar: Prof. Parrott has just come in and I believe is very much interested in work with aphids. I wonder if he has any information about the time of hatching of the eggs in relation to the different sprays.

Prof. Parrott: One of my objects in coming to these meetings was to hear some of the papers given this afternoon, but I appear to have arrived too late to hear some of them. I am very much interested in the discussion of what I take to be the paper dealing with Apple Aphids. I agree with what was said by one speaker that by the time that the buds have broken and the leaves of the more advanced buds are out from ¼ to ½ inch, the eggs of the three species, *pomi, sorbi* and *avenæ* have hatched. I make this statement with considerable assurance, because in two years' experience on one variety of apple we have been able to combat all three species, that is to eliminate the insects by drenching the trees.

Q.—What was that variety?

Prof. Parrott: Rome Beauty. As a matter of fact one of the papers that I want to present at the Association of Economic Entomologists is one dealing with the control of the Rosy Aphis, as a problem for the extension entomologist. I believe we can get as clean-cut results in spraying for *sorbi, avenæ* and *pomi* as for almost any of the common insects on fruit trees. In our work we use several combinations of spraying materials, but the one we are recommending is composed of lime-sulphur solution, using the stock material at the rate of 1 to 7 or 1 to 8 of water, if scale insects are on the trees, and then to 100 gallons of the lime-sulphur we add ¾ pint of nicotine sulphate. This is the spray we use on the Station grounds.

Prof. Caesar: Your 100 gallons are equal to about 80 gallons of the measure which we use.

Prof. Parrott: Yes, you use the imperial gallon measure. We have the San José Scale in nearly all the leading fruit growing sections of New York, and so we use the combination to combat the scale, apple scab and the rosy aphis. I don't know how the idea that one cannot rely on spraying at this time to combat the rosy aphis was so firmly established in the minds of some entomologists. I have been wondering if in breeding experiments by various workers, infested wood was in all cases obtained from identical situations. A miscellaneous assortment of infested wood, taken from trees subject to different conditions, might lead to wrong inferences as to the length of the incubation period. At Geneva, *Aphis avenæ* hatches first. As regards *pomi* and *sorbi* I don't think there is a great difference in time of hatching. I must admit that until this year we did not know the nymph of the first instar of *sorbi*, and the time of hatching was determined

by spraying at different dates. This year we were able to recognize the nymphs of the first instar of sorbi, and now that their identities are established we may safely say that most of the nymphs of the three species are out by the time that the leaves of the more advanced buds are projecting from one-fourth to half an inch.

MR. BIGGAR: Which do you think would be more effective, concentrated or soluble sulphur?

PROF. PARROTT: I am unable to advise you as to the wisdom of combining nicotine sulphate with soluble sulphur. You doubtless know that soluble sulphur depends for its insecticidal and fungicidal properties upon polysulphides and sulphides of sodium while lime-sulphur depends on sulphides of calcium. In New York we do not recommend a combination of arsenate of lead and soluble sulphur because soluble arsenic is formed. Soluble sulphur can be supplied by itself for the control of San José Scale or Leaf Blister Mite or for the control of Leaf Curl. We take a great deal of pains in our recommendations that fruit growers and farmers should clearly understand that they should not use sodium sulphide in combination with either arsenate of lead or other arsenicals.

PROF. CAESAR: I have used calcium arsenate in combination with soluble sulphur and burned half the leaves off the trees. Is it not possible that your excellent results with the strong lime-sulphur (1 gallon to 8) and black leaf 40 on the aphids was due partly to the action of lime-sulphur on the eggs that were almost hatching?

PROF. PARROTT: Yes, that is possible for a small percentage of the eggs; and has already been suggested by the manufacturers of nicotine sulphate. However, now that we are able to recognize the nymphs of the first instar, both Mr. Lathrop and myself were able this year, by observation, as by experimental operations, to show that as far as Rome apples were concerned, *sorbi* had all hatched by the time we began spraying. Now had you asked me in 1915, as I have previously stated, I could not have spoken so definitely on this point because we did not know the nymphs in their first instar.

MR. ROSS: This spring we obtained excellent results in the control of *A. malifoliæ, A. pomi,* and *A. avenæ* in a twelve acre orchard near Vineland, but later on our work was somewhat spoiled by *pomi* migrants which flew from neighbouring apple trees into the orchard and reinfested the trees.

PROF. PARROTT: I may say in addition, that some of our associates in New York who have been somewhat reluctant to agree with us in some of our statements relative to *sorbi* are beginning to change their minds. After seeing the sprayed plants one could hardly draw conclusions very different from those I have presented. The problem for experimental workers now is to ascertain if it is profitable for the average grower to spray each spring in order to avoid losses by the rosy aphis.

DR. DEARNESS: I should like to ask Mr. Ross whether that migration season seems to hold in the case of the Rosy Aphis. Did I understand you right that the generation that comes from the Plantago is oviparous, that there is a migration of viviparæ to the Plantago, and then that there is a generation of oviparous from that and whether that seems to be necessary?

MR. ROSS: The alatæ which migrate from the apple to the plantain are viviparous, and their progeny are viviparous. The return migrants from Plantago to apple are likewise viviparous, but their progeny—the sexual females—are oviparous.

DR. DEARNESS: You think that the migration to the Plantain is necessary to that species?

MR. ROSS: I am not quite sure about that. We have been able to make *sorbi*

complete its cycle on the apple. I have some sexual females on the apple at the present time that we obtained from colonies that were on the apple all year. Of course I have been breeding the aphids under insectary conditions.

DR. DEARNESS: Does it stimulate sexual development to be on the Plantago?

MR. ROSS: I do not know. The oviparous forms are given birth to by the migrants that fly back to the apple. In working with *avenæ* I was rather interested to find that I could not get that species to remain on apple even where I kept the specimens isolated, and I came to the conclusion that the migration instinct was much more strongly developed in this case than in the case of *malifoliæ*.

PROF. BRITTAIN: The important point is that a number of our farmers will have to spray for this green apple bug. We do no spraying for this insect until just before the blossoms open. Is it going to be necessary to spray for *malifoliæ* and make two separate sprayings for the green apple bug? One of the orchards in which we were spraying for this latter pest had quite a severe outbreak of *sorbi*, but we omitted that first spray. We find that when we spray to control the green apple bug we have to give an extraordinarily thorough application, and we found that such an application gave us a fair commercial control of *malifoliæ* as well, though we did not destroy all of them, for the leaves curl right around them and provide a fine protection.

Q.—What spray gave you the best results against *malifoliæ*?

PROF. BRITTAIN: At the time the small leaves were just about the size of a ten cent piece.

MR. ROSS: I should like to ask Prof. Parrott if he ever recommends that second spray when the blossoms are just showing pink for the aphids.

PROF. PARROTT: I do not, Mr. Ross; but if you study the literature on spraying for apple aphides you will find all sorts of recommendations. If in New York we deferred treatment until that time, a great many of the stem-mothers would be missed by the application, on account of the curled leaves. I thoroughly endorse what was just said, that farmers as a rule do not spray thoroughly enough to control green apple bug. Certainly they do not control *malifoliæ* or *sorbi* for the same reason, and that is without doubt one of the problems now before us. We should encourage spraying practices that are calculated to hold the aphides in check.

PROF. BRITTAIN: Spraying with nicotine is expensive. With us we frequently have to put on two applications, but if we had to put on three it would ruin us.

PROF. PARROTT: I think in your case it would be worth experimenting to determine if you can delay the spray.

PROF. BRITTAIN: In our work it is certain that we did not miss enough to pay us to put on a third application, but the work was done with great care.

PROF. CAESAR: We have sometimes omitted the first application, and for San José Scale waited until just as the pink was showing, yet obtained good results on the scale without appreciable injury to the foliage.

MR. WINN: Mr. Ross states that he has specimens of these aphides. I should like to know what method he takes of mounting or preserving such minute insects.

MR. ROSS: We use 70 per cent. alcohol for preserving aphides.

NOTE ON PHYSONOTA UNIPUNCTA (COLEOPTERA).

ALBERT F. WINN, WESTMOUNT, QUE.

In several parts of Mt. Royal Park, Montreal, there flourish large patches of a wild sunflower, *Helianthus decapetalus,* notably around the edges of the open area south and west of the toboggan slide, known as the "riding ring." This plant has long been known to local entomologists as the food of a species of Tortoise-beetle, and the early volumes of the *Canadian Entomologist** contain several articles by Caulfield and others relative to its habits and life-history.

Like most other insects, *Physonota unipuncta* has its years of abundance, and years when it seems to be wholly absent; but when common it is a most attractive beetle, resting quietly on the upper side of the leaves on a hot July day, its brilliant green and gold hues looking as if they belonged to a tropical insect. The ugly, soft, spiny larvæ with their forked tails recurved over the body and covered with remnants of cast off skins and excrement as is usual among the Cassidini; and the yellow and black pupæ—vaguely recalling in shape the horse-shoe crabs of the Atlantic coast—are also common on the plant.

By the end of August and early September, beetles again are seen on the leaves, but very different from the midsummer ones. There is not a trace of metallic green, but a sombre black and white, some examples mostly white, others with the black preponderating. Mr. Caulfield, who spent a good deal of time studying the beetle always used to refer to the summer and the autumn *broods* in just the same way that Lepidopterists speak of seasonally dimorphic butterflies and moths. On many occasions I have observed the beetles at rest and the larvæ at work, but as the adults, both green and black and white, have a most unfortunate habit of losing all their beauty and markings, becoming a uniform sickly yellow in cabinet specimens I have not paid much attention to the insect further than occasionally collecting a few larvæ along with other live stock to rear at home.

A few years ago, however, I was hunting around in the late fall for evidences of Lepidopterous boring larvæ in various plants, and this Helianthus came in for a little digging up by the roots, but very little injury was found. During the operations, among the earth upturned, a Physonota was noticed, and to my great surprise it was in its glorious green dress. No others were found, and although the matter seemed puzzling and contrary to what might be expected, a possible explanation was that occasional specimens of the early or summer brood went into hibernation.

Recently I had occasion to ask our good friend Mr. Morris, of Peterborough, whose papers on the relation of beetles to certain plants have been so interesting, whether Physonota was among his acquaintances. He replied that he had not found it, but would like to get some, so a look-out was kept for larvæ, and in July a box of larvæ and some leaves was sent. They reached him just before he was leaving for a vacation and he had a considerable amount of difficulty in finding an acceptable substitute for *Helianthus decapetalus,* and then had to find some one willing to look after the welfare of the repulsive looking grubs. He succeeded in doing both and reared some of the beetles.

Early in September I found that the sunflower had spread very much at the back of the western part of our Mountain, where it used to be rarely met with, and

*Caulfield, Can. Ent., xvi, 227 (1884); xviii, 41 (1886.)
Hamilton, Can. Ent. xvi, 134 (1884); xviii, 113 (1886.)

that beetles were in hundreds on the leaves as well as larvæ and pupæ, and a few were brought home. A week later the plants were again examined and among the many black and white beetles was one of a green color—not so brilliant as the July ones, but still decidedly green. Things were looking interesting now, so I hunted very carefully for nearly an hour and found two more green ones. These were boxed and brought home alive along with scores of the black and white ones. The following day when changing the food the green ones were looked for but instead of three there were *four* in the box. My first thought was that possibly one had been introduced into the box unnoticed beneath a leaf; but when they were taken out of the box it was seen that while all were green, they were not all of the same brilliancy. The four were then placed in a separate box from the black and white ones to see what would happen next. Next day showed clearly what was going on: the black and white ones were all slowly but surely assuming the green color, the lower edges of elytre becoming green first and gradually spreading to the suture, the black becoming an olive green and the white yellowish. As the green brightens the yellow spots disappear and in a couple of days they are so altered that one could hardly believe it possible unless the change was actually seen going on.

I can recall no reference to such a change of color in an apparently mature insect, and would like to know what explanation can be given of the changes that go on and will gladly try to furnish living material next year to anyone wishing to investigate. The unearthing of the green one in the fall was now explained, but I took the first opportunity of revisiting a Helianthus patch and poked around a little amongst the dead leaves and surface soil. Sure enough, the beetles found on and below the ground were all green, while the black and white ones were plantiful on the leaves and flowers.

Among the hundreds of beetles observed on the plants during September and the many kept alive at home there was no apparent disposition to mate, and it seems certain that this does not occur till they emerge from winter quarters. It also seems that instead of two annual broods we have but one in Montreal; the glorious green beetles of midsummer are the transmuted black and white ones that quitted the plants and entered the ground in the previous September. Like other hibernating imagoes the time of appearance differs in individuals, and mating and egg laying are spread over an extended period, hence the finding of the insects simultaneously in all stages on the plants. It is, of course, possible that a partial second brood occurs under favorable conditions, and this could easily be found out by breeding from the egg. The larvæ are not at all difficult to rear if one has a supply of fresh Helianthus leaves at hand. I have never seen the insects except on Helianthus in the fields, but see that Blatchley* states that "it occurs on flowers of Crataegus; on the horse-mint (Monarda) and on resin-weed—both larvæ and adults feeding on the latter." It is interesting to note that he refers to the color of imago as pale greenish-yellow.

*Coleoptera of Indiana, p. 1229.

PRELIMINARY NOTES ON THE USE OF REPELLENTS FOR HORN FLIES AND STABLE FLIES ON CATTLE.

A. W. Baker, Ontario Agricultural College, Guelph.

The following notes are on the results of work done during the summer of 1914. The summer of 1915 was so excessively wet that satisfactory spraying experiments on cattle could not be carried on, and it was found impossible, due to stress of other work, to continue these experiments during the summer of 1916. Since the results obtained, however, may be of interest to some, it was thought advisable to give these preliminary notes at this time.

Cattle Used in the Tests.

The tests of repellents were conducted on part of the beef herd of the Ontario Agricultural College. Fifteen milch cows and seven yearlings were used. On certain of these the same repellent was used continuously, and some also were retained as checks throughout all the tests. All repellents, however, were given a test on cattle of various types and colors, and cattle of various types and colors were also used as checks. It was found that the repellent action of all the sprays was practically lost in a week or ten days, so some cattle were used as checks which were used for spray tests earlier or later in the work. This shifting of sprays and checks made it more possible to get thorough results in all tests. The tests were continued without interruption, save on rainy days, throughout the months of July and August. The cattle were sprayed immediately following the morning milking. Notes were made in the pasture in the middle of the afternoon, and in the stable in the morning before spraying.

The writer was assisted in the work by Messrs. A. R. Burrows and R. S. Hartley, student-assistants in the Department of Entomology of the Ontario Agricultural College.

Object of the Work.

This work was undertaken with a view to securing if possible a fly repellent which could be prepared cheaply by the farmer, which would give repellent action for at least two days if possible, and which at the same time would not taint the milk, blister the animal or make the coat unsightly.

Repellents Used.

Four commercial fly repellents were tested and ten home-made repellents. Of the latter, three were repellents which had previously been recommended by various workers, and the remainder were mixtures which were devised by the writer.

The following is a list of the various repellents used, with the formulæ for preparation, and a very brief summary of the results secured.

Commercial Repellents.

The commercial fly repellents used were La Lo, Williams and Coopers. All three gave good repellent action, but this was not so long continued in the case of Williams and Coopers as with La Lo. Where cattle were thoroughly sprayed it was found that the cost of all commercial repellents used was excessive. Some blistering was noted on three animals sprayed with La Lo, and some very slight blistering on one sprayed with Williams.

Black Leaf 40 was also tested as a repellent. This was used in the proportion of one part to 686 parts of water, both with and without oil of citronella. Fair repellent action was secured in the latter case, but this was evidenced for such a very short time that the mixture could not be considered of any practical value as a fly repellent.

HOME-MADE REPELLENTS.

I. Kerosene Emulsion:

½ lb. yellow soap.
1 gal. soft water. } After preparation, add 1 gal. water.
2 gals. kerosene.

This was used in proportions of 1 to 5 and 1 to 3 of water, both with and without oil of citronella. At no strength used was repellent action secured, which was sufficient to enable us to consider it of any value for practical use.

II. Flour Emulsion:

6 oz. flour.
1 qt. kerosene.
2 gals. water.

As with Kerosene Emulsion, the repellent action secured with this mixture was so slight and of such short duration as to be of no practical value.

III. Milk Emulsion:

Slightly sour milk, one part.
Kerosene, two parts.

This stock solution was used in proportion of 1 to 15, 1 to 12, and 1 to 8, of water, both with and without oil of citronella. When used in the proportion of 1 to 8, with oil of citronella, very fair repellant action was secured, which was quite plainly evident on the day following the spraying. This suggested to us that the milk emulsion could be used as a medium for the application of some substance with a stronger repellent action. The milk emulsion we found could not be used as a practical repellent in itself, because of the large quantities which it was found necessary to apply to each animal.

IV. Milk Emulsion and Olive Oil:

1 part slightly sour milk.
1 part kerosene.
1 part olive oil.

This stock solution used 1 to 8 parts of water. The repellent action secured was comparatively slight and in any case the introduction of olive oil made the spray so costly that it could not be considered of practical value, even though much smaller quantities could be used than was the case with milk emulsion itself.

V. Milk Emulsion and Linseed Oil:

Stock Solution No. 1.

2 parts slightly sour milk.
2 parts linseed oil.
3 parts kerosene.

Used in proportions of 1 to 8, 1 to 4, 1 to 2, both with and without oil of citronella. Even in the proportion of 1 to 2 with the addition of oil of citronella, the repellent action secured was only fair, and the cost was such that the mixture could not be considered of practical value.

Stock Emulsion No. 2.

1 part slightly sour milk.
1 part linseed oil.
3 parts kerosene.

This stock solution was also used in the proportions of 1 to 8, 1 to 4, and 1 to 2, both with and without oil of citronella. As with the first stock solution the repellent action was such that considering the cost the mixture could not be looked on as of practical value.

VI. Milk Emulsion, Olive Oil and Linseed Oil:
1 part slightly sour milk.
1 part olive oil.
1 part linseed oil.
3 parts kerosene.

Used in the proportions of 1 to 8, 1 to 4, and 1 to 2, both with and without oil of citronella.

The repellent action secured by this mixture was only fair, even when used in the proportion of 1 to 2, with oil of citronella, and the cost was such that the mixture could not be considered of practical value.

VII. Milk Emulsion and Fish Oil:
Mixture No. 1.
2 parts milk emulsion, stock solution.
1 part fish oil.
4 parts water.

When used with oil of citronella the repellent action secured was good, and it was found necessary to apply only small quantities of the mixture.

Mixture No. 2.
1 part milk emulsion, stock solution.
1 part fish oil.
4 parts water.

When used with oil of citronella good repellent action was secured, and it was found necessary to apply only small quantities of this mixture.

The success of the milk emulsion as a repellent when fish oil was added to it led us to believe that if we incorporated fish oil in the stock solution and then diluted this with water in the necessary proportions, that we should have a rather satisfactory repellent. This led us to compound the following mixture.

VIII. Fish Oil, Kerosene and Milk.
1 gal. fish oil.
1 gal. Kerosene.
1 gal. slightly sour milk.
6 oz. oil of citronella.

This stock solution was used in proportions of 1 to 2, 1 to 3 and 1 to 4, of water. The repellent action secured in all cases was good, so much so that the mixture can be recommended as having decided practical value.

This mixture gave far the best results of any home-made mixtures tested, and the amount required is so small that the cost of spraying is extremely slight as compared with that of commercial repellents.

Another summer's work will doubtless improve the stock solution, in that the proportion of the ingredients may be varied somewhat, but the writer feels that the mixture essentially as given will form the basis for a very satisfactory home-made repellent.

Since the work outlined here was undertaken this mixture has been recommended for trial to a considerable number of farmers, and in all cases where reports have been received from them, the mixture has given very good results as a repellent.

It was found necessary when this spray was first started to apply it every day

to secure good results. The writer feels sure, however, that if spraying was continued throughout the whole season with the one mixture that the time of spraying could be reduced to once in every two days, or even once in every three days. In the same way probably the strength of the spray could be reduced after using for some time.

Amount of Spray Used.

When used in the proportion of 1 to 2, one imperial quart was sufficient for eleven cows, that is one gallon as applied at 1 to 2 was sufficient for 44 cows. At 1 to 4, one gallon as applied was sufficient for 32 cows. It should be borne in mind that in spraying each cow was absolutely covered from horns to hoofs with the mixture, not simply a band along the back and sides, as is so often done.

It was found that better results could be secured in spraying the cattle by using a cheap hand-atomizer sprayer than by using a knapsack-sprayer.

Working with these hand sprayers two men in ten minutes could thoroughly spray 13 cows, averaging about one and two-third minutes per cow.

The Cost of Spraying.

The following cost summary is based of course on pre-war prices:

Fish oil, 1 gal.	$0 80
Kerosene, 1 gal.	20
Milk, 1 gal.	20
Oil of citronella, 6 oz.	60
	$1 80

i.e., $1.80 for 3 gallons of stock solution.

In the proportion of 1 to 2, the cost as applied was 20 cts. per gallon.

In the proportion of 1 to 4, the cost as applied was 12 cts. per gallon.

The cost then of spraying thoroughly with this mixture at 1 to 2 is 5/11 cts. per cow. The cost of spraying at 1 to 4 is 3/8 cts. per cow.

As mentioned above the writer found this mixture by far the most satisfactory of all the home-made repellents tested, but he would like it borne in mind that it is the result of only one season's work, and although he is satisfied that it will form the basis of a very satisfactory repellent, he feels that the proportions used can probably be improved in another season's work, and so does not recommend this mixture as finally satisfactory.

Prof. Parrott: Was any work done while you were carrying on this experiment with the repellents to determine the effect of the treatments on the yields of milk or butter?

Mr. Baker: None. I hope before I put it in final form to do this work: to run check animals exposed to all the attacks of flies outside, and to treat others with a series of sprays of different proportions, and then keep a record of milk returns in both lots. So far as I know there has been only one record of systematic work done along this line.

Prof. Parrott: Nineteen years ago I was given the problem of determining the most efficient materials for protecting animals from flies, and the conclusions you have drawn are in the main quite similar to the results I obtained. It was not very hard to decoct a preparation as efficient as some of the repellents on the market. I found also that both commercial and home-made mixtures gave only temporary relief, and there was always the question of whether or not the applications had any effect on the yields of milk or butter. When at the Ohio Experi-

ment Station I was actually confronted with data obtained by another department showing that applications of commercial and home-made insecticides did not give any protection at all as measured by milk yields. I considered the data inconclusive, and I do believe that a careful experiment would show that flies do diminish production. If so, data along this line would encourage farmers to give their animals proper care.

MR. BAKER: There is no doubt that it gives increased beef production.

PROF. PARROTT: I am of the impression that it is possible to divide a dairy herd so as to get conclusive data. Such an experiment would certainly be worth while.

DR. HEWITT: The experiences in the Texas Fever Tick uphold that idea, if only you can convince the farmers of the advanced milk production so that they will undertake measures of control.

MR. BAKER: The primary reason this work was undertaken here was because of the fact that every summer we have numerous requests from farmers for a satisfactory fly repellent, and they seem to be unanimous in the statement that the milk production of the cattle is seriously injured. I can call to mind probably half a dozen communications last year definitely stating that the cattle had gone back on the milk flow where the flies were extremely bad.

PROF. PARROTT: If a dairy expert would co-operate with a entomologist on the problem, one ought to get very valuable data, because fly attacks must cause great discomfort to cattle, and thus reduce the yields of milk.

DR. HOWARD: I should like to ask Mr. Baker if oil of citronella can be purchased in this country for ten cents an ounce now. We have been trying to buy oil of citronella this past summer, and after the apothecaries had sold out their previous stock it was impossible for them to obtain any more. The situation was worse than the price being prohibitive, for we could not get it at all.

MR. BAKER: The prices I have quoted were those prevailing before the war. Until the druggists ran out of oil of citronella, we could get it at a price considerably increased, but since then we have tried and were not able to get it in the city of Guelph.

MR. CRIDDLE: I have seen a good deal of the cattle business in Western Canada. There is a very marked decrease in the milk production during the fly season. For that simple reason very many cattlemen keep their cattle until after the fly season is over so that they can fatten them up again.

EVENING MEETING.

On Thursday evening the auditorium of Massey Hall was filled with students of the College and the Macdonald Institute, in addition to the members and visitors from the town of Guelph, who came together to hear a lecture on "The Relation of Insects to Disease in Man and Animals," by Dr. L. O. Howard, Chief of the U. S. Bureau of Entomology at Washington. A large number of lantern slides were exhibited, which added greatly to the interest, and rendered more intelligible to the student body the more technical positions of the address.

In the absence of President Creelman, the Society was welcomed to the College by Prof. Zavitz, and at the close of the meeting a vote of thanks, proposed by Dr. Hewitt, and seconded by Prof. Lochhead, was tendered to Dr. Howard for his instructive and highly interesting address.

THE RELATION OF INSECTS TO DISEASE IN MAN AND ANIMALS.

Dr. L. O. Howard, Washington, D.C.

There are many here to-night to whom much that I shall say will be an old story. In fact, more than sixteen years ago, in a lecture which I gave before the Royal Society of Canada, May 30th, 1900, I showed some of the same lantern slides, which I shall show to-night, and even then the interest in the subject was very keen and was still keener when three and one-half years later I spoke before the Entomological Society of Ontario, at its September, 1903, meeting at Ottawa, on the transmission of yellow fever by mosquitoes. That time my lantern slides were held up at the border, and I am able to-night to show them for the first time to the members of this Society.

After all, what is a period of sixteen years in the history of medicine and of medical discoveries? The whole great field has practically developed within the last twenty years. Take some standard medical work of twenty years ago, such as the 1896 editions of Osler's "Theory and Practice of Medicine," and you will find absolutely no mention of insects as connected with the etiology of disease either of man or of the higher animals.

And yet the foundations were already laid. In 1889 Theobald Smith, eight years out of Cornell, and six years out of the Albany Medical College, and already farther advanced as an investigator than any of his teachers, discovered the causative organism of the so-called Texas fever of cattle, in the shape of a minute pear-shaped protozoan in the red blood corpuscles, to which was given the name *Pyrosoma bigeminum* (now known as *Babesia bovis*). With the experimental aid of F. L. Kilbourne, a doctor of veterinary medicine and engaged, as was Dr. Smith, in research work under the Bureau of Animal Industry of the United States Department of Agriculture at Washington, he showed that this organism is carried from southern cattle to non-immune cattle by the so-called southern cattle tick (*Margaropus annulatus*). The results of this experimental work were published in 1893.

Even before this, Dr. Patrick Manson, now Sir Patrick Manson, demonstrated the carriage of the parasitic worm, *Filaria nocturna*, responsible for certain of the diseases grouped under the name filariasis, from mosquitoes to man.

This, however, was by no means as significant as the discovery of Theobald Smith, and undoubtedly attention would have been directed at an earlier date to the possible transfer by insects of diseases caused by blood-inhabiting micro-organisms with man, had the revolutionary paper by Smith and Kilbourne attracted more general attention. But it came from a veterinary service, and was published in the Annual Report of the United States Department of Agriculture, a publication which at that time unfortunately received but little attention from the scientific world in general.

So it was not until 1897 that Ross, at the suggestion of Manson, began out in India his work on the possible carriage of malaria by certain mosquitoes, an investigation which resulted triumphantly in 1898, and which ranks as one of the monumental discoveries in medical science.

Ross's work was immediately corroborated by Italian workers, and intensive investigations of the blood-inhabiting protozoa were immediately begun. In a very short time sound proof of the carriage of yellow fever by *Aedes calopus* was brought forward by Walter Reed and his co-workers, Carroll, Lazear and Agramonte, and research in this direction was taken up all over the world. Constantly increasing in

volume, discovery after discovery has been made, until at the present time, practically only a score of years after its inception, the literature on this subject has become enormous, the workers in the field constitute an army, comprehensive volumes on medical entomology have been published (two in the United States within the past year), advanced students are taking up the subject as their life work, and as the months go by the field opens further and further until it is evident that its importance especially regarding the etiology of tropical disease, can scarcely be exaggerated.

So numerous have the discoveries become of late that it would take a course of lectures to display the results, and I must confine myself to-night to comparatively few, easily illustrated aspects.

It is convenient, and in fact necessary, to divide the field in any discussion into three categories:

First, insects as simple carriers of disease, the accidental carriers as it were; that is, insects frequenting places where disease germs are likely to occur, and conveying these in their stomachs or on their bodies to food supplies. This class is notably illustrated by the house fly.

Second, insects as direct inoculators of disease. These are biting insects which feed upon diseased men or animals, and carry the causative organisms on their beaks and insert them into the circulation of healthy individuals. In this way anthrax is carried by biting flies; surra is carried the same way, as is also the *nagana* or tsetse-fly disease of cattle. So also is bubonic plague carried in this manner by rat fleas, but here there is more than a passive carriage, as is also the case with the tsetse-fly disease.

The third category, and this is perhaps the most important, insects as essential hosts of pathogenic organisms. These are the cases in which the parasitic organism undergoes its sexual generation in the body of its insect host and another, non-sexual, generation or generations in its warm-blooded host. To this class belong the malarial mosquitoes, the yellow fever mosquito, and the rapidly increasing number of species that carry Trypanosomiases, Leishmaniases, Spirochætoses, and the ticks that carry relapsing fevers and other fevers of man and animals, and the lice that carry typhus fever.

Insects as Simple Carriers of Disease.

The House-Fly. (Lantern slides and general discussion).

Cockroaches, ants and other insects. It is perfectly possible, as above stated, that any insect which comes in contact with, either accidently or for feeding purposes, excremental or other material containing pathogenic organisms and then passes to the food or bodies of men and animals may thus become a simple carrier of disease. There are plenty of obvious illustrations of this. Darling, in the Canal Zone, has shown that ants which flourish in the tropics may thus carry disease, and in fact the little house ants in temperate regions may also function in this way. The same thing may be said of cockroaches, and especially of the small so-called German cockroach, which multiplies excessively in unclean establishments, and it may also be said of the latrine fly (*Fannia scalaris*) which breeds in latrines and which has frequent access to food, although not so greatly attracted to food supplies as is the true house-fly. And there are numbers of other insects which may from time to time play this part, although, speaking of flies, I pointed out many years ago that over 97 per cent. of the flies found all over the country in dining-rooms and kitchens, are true house-flies.

Insects as Direct Inoculators of Disease.

This is another simple relation, and the insects which carry disease in this way are piercing species, taking up germs and inserting their contaminated mouth parts into their healthy victim. This transfer is precisely analogous to blood-poisoning from the prick of a contaminated needle or pin. A little earlier this method of carriage of disease was considered to be more easily possible than it is at present. A study of the habits of many of these blood-sucking insects indicates that, while they take a very full meal, they frequently wait for many hours before attempting another bite, and in the meantime ingested bacteria may be digested or excreted and the beak become cleansed or the micro-organisms dried up.

Nevertheless this method still holds, and it is in this way that certain biting flies carry the disease known as anthrax or malignant pustule, and in the same way the very destructive disease of domestic animals in oriental regions, known as surra, is carried by gadflies. In this same way also the disease of cattle in Africa long known as fly sickness or nagana is carried by one or more of the tsetse flies of the genus Glossina. Although, while it is possible for this disease to be almost immediately inoculated after the first bite of a diseased cow, by simple transfer, the fact that after a term of days has elapsed inoculation again becomes possible indicates that the parasitic organism may undergo a sexual development in the body of the fly. This will be brought out later in speaking of sleeping sickness.

In the case of the rat fleas and bubonic plague, about which so much has been written of late years, there occurs also something more than a passive carriage, although the causative organism of bubonic plague is one of the bacteria, and is known as *Bacillus pestis*. The story of the discovery of the carriage of this dread disease by fleas is a most interesting one, but cannot be told at length. Any flea which attacks both rodents and man may be an agent in the transmission of the disease, and several species are thus implicated. Inasmuch as the causative organism of the disease is a Bacillus, and is not dependent upon any insect for the completion of its development, theoretically any blood-sucking insect which feeds upon a plague-infected man or animal, and then passes to a healthy individual may carry the disease. Thus bacilli have been found in a head-louse taken from an infected man, and in a louse taken from an infected squirrel.

Moreover, it has been found that in bubonic plague the disease may be spread from man to man without any intermediary whatever. Conclusive evidence to this effect was found by Dr. Strong and Dr. Teague during the Manchurian epidemic of 1910-11. This type of the disease, however, forms a very small percentage of the human cases, and in the great majority of cases of a plague epidemic fleas are the responsible carriers, and as a rule rats or other rodents, such as the ground-squirrels of California, form the other end of the chain. So practically all the measures in the modern cities are based upon the destruction of rats, and we in the United States recall with pride the campaign against the rats and the plague carried on so successfully only a few years ago in San Francisco, under the direction of the present Surgeon-General of our Public Health Service, Dr. Rupert Blue.

While feeding, fleas are in the habit of squirting blood from the anus, and where they have been feeding upon mice and rats dying of plague, this excreted blood is found to be full of the plague bacilli. Thus, not only may the disease be caused by the bite, but by subsequent scratching. Moreover, Bacot and Martin have shown very recently that plague-infected fleas regurgitate blood through the mouth, and that the disease may be thus transmitted.

Insects as Essential Hosts of Pathogenic Organisms.

Beyond the mere statement that a number of tapeworms undergo their sexual stage in some insect or other Arthropod, and that of these at least two are occasional parasites of man, while others commonly affect domestic animals, it may be well to point out that one of these species, *Hymenolepis diminuata,* living commonly in the intestines of rats and mice, has as its alternate host certain insects which feed in meal, and that man may become infected by eating the dejecta of such insects in dirty cereals.

It should also be stated in passing that several nematode worms have this dual relation. Sir Patrick Manson's discovery of the carriage of *Filaria nocturna* by *Culex fatigans,* thus producing filariasis, is exemplified most terribly by certain forms of elephantiasis. Further, recently Dr. Ransom, of Washington, has shown that a common nematode parasite of the house fly, known as *Habronema muscæ,* is, in another stage, a stomach parasite of the horse, and that the embryos produced by the parent worms in the stomach of the horse pass out with the fæces and enter the bodies of fly larvæ, which are developing in the manure. Infested flies, dead or alive, are accidently swallowed by horses, and the parasite completes its development to maturity in the stomach of this definitive host.

There is still another nematode which may be mentioned on account of the fact that it brings in an entirely new type of insect host, namely *Echinorhynchus gigas,* a common parasite of the pig, and reported as occurring in man. In Europe the usual intermediate hosts are the larvæ of the cockchafer, and in the United States the common white grub or larva of the so-called June-bug.

Mosquitoes and malaria. (Discussion and lantern slides).

Mosquitoes and yellow fever. (Discussion and lantern slides).

Insects and trypanosomyiasis. The curious, flagellate protozoa known as Trypanosomes are coming more and more to the front as causative organisms of various diseases, especially in the tropics. It is one of these organisms which causes the nagana of African cattle, and is carried by the tsetse fly known as *Glossina morsitans.* As noted above, this insect is not only a direct inoculator of the disease, but is an essential host of the parasite. Sir David Bruce, of England, discovered the causative organism, and established the fact of its transfer by tsetse flies, but it was a German observer, Kleine, who demonstrated in 1909, that a part of the life cycle of the parasite takes place in the fly, which becomes infective again after ten days, and able to transmit the disease for weeks thereafter.

Another trypanosome disease which has become famous is the one which causes the sleeping sickness of Africa, and of this disease the tsetse fly *Glossina palpalis* is the necessary secondary host. This disease is said to have caused thirty thousand deaths between 1902 and 1905, in the British Province Bugosa on the Victoria Nyanza.

Down in Brazil it has been quite recently discovered that a disease known as Opilaçao, a wasting disease of children, is caused by *Trypanosoma cruzii,* and that the definitive host of this organism is one of the large biting true bugs known as *Conorhinus megistus,* a close relative to the so-called giant bedbug of this country. *Conorhinus sanguisuga.* This discovery by Chagas, of the Oswaldo Cruz Institute, was considered so important that another learned member of the Institute, Arturo Neiva, visited the United States and Europe just before the war, in order to monograph competently the biting bugs of this group.

Insects and Leishmanioses. The Leishmania organisms are intracellular

parasites allied to the trypanosomes. These parasites are responsible for a number of tropical diseases, especially the one known as *kala azar* of human beings, and here the evolutive cycle is claimed by Patton to take place in the common bedbug, but this, however, is not generally accepted.

Ticks and Spirochætoses. The spirochætes are probably protozoa. Spirochætosis is also referred to in the literature as Spiroplasmosis and Babesiosis. These organisms are responsible for several serious diseases of animals and two of man. The organism of Texas fever of cattle, referred to in our opening remarks, and which is carried by the cattle tick, is an example. The sexual reproduction of this organism in the blood of cattle is well known, but the sexual reproduction in the tick has not yet been made out, although in a related species, *Babesia canis,* of the dog, causing maligant jaundice in Africa and parts of southern Europe, this cycle has been worked out by Christopher.

The life cycle of a spirochæte has been especially worked out in the disease known as spirochætosis of fowls, which occurs in southeastern Europe, Asia, Africa, South America and Australia. This disease is transmitted from fowl to fowl by a tick known as *Argas persicus.* The full life cycle has been worked out especially well by Balfour and Hindle, and is diagrammatically represented on the accompanying slide.

Ticks and Rocky Mountain Spotted Fever. This is the first of the probable spirochæte diseases of man carried by ticks. (Discussion and lantern slides).

The other human disease referred to is the European relapsing fever, which at first was supposed to be carried by bedbugs, but which has since been shown to be carried by lice.

This brings us to *Typhus fever and lice.* (Discussion and lantern slides).

But now we must stop. There are many subjects in the field which we have not touched. Tick paralysis, for example, is a most interesting and novel subject. This disease occurs in Australia, Africa and North America. In Oregon thirteen cases have been found in the practice of a single physician. The attachment of a tick brings about progressive paralysis involving motor, but not sensory nerves. It seems a unique malady. Hadwen and Nuttall, showing that it is not infectious and that there is apparently an incubating period in the tick, suggest a specific causative organism, but others hold to the theory of nerve shock.

Attention should also be called to the fact that, in spite of the host of discoveries already well established, there is a danger in our tendency to exaggerate the importance of insect transmission, and to overlook, even in cases where insects may occasionally be concerned, the greater importance of other modes of infection. This is indicated by Sambon's theory of transmission of pellagra by Simulium—a theory which was advanced with enthusiasm on the ground that it fitted into the known facts in the epidemiology of the disease. It took two years of hard work on the part of members of the force of the Bureau of Entomology, working in collaboration with the Thompson-McFadden Pellagra Commission, to upset this theory in a thoroughly scientific manner. As has been pointed out several times of late, there is always considerable danger in conclusions based on epidemiological findings. Transmisson experiments are necessary.

One conclusion must be drawn which can hardly be disputed: There is an enormous field for the entomologist in the careful study of all of the aspects of the biology, of not only those insects which have already been shown to be disease carriers, but of those which are likely to be implicated. It is to the trained economic entomologist that we must look for the methods of destruction of those

insect carriers, and the prevention of this class of diseases lies at his door, rather than at that of the physician. Either that, or sanitarians must be trained in what is now known as medical entomology.

SECOND DAY'S SESSION—FRIDAY, NOV. 3RD.

THE WOOD OF DESIRE.

FRANCIS J. A. MORRIS, PETERBOROUGH.

In September, 1913, about a week after my arrival in Peterborough, I found myself toiling, one hot afternoon, up a steep hill-side just east of the city. All the explorer's romantic sense of adventure thrilled me, for these were pioneer days in a new district, and I was very curious to know what lay beyond the hill, what sort of view would unroll before me from the little knot of pines that topped the height. Up and up I struggled, like stout Cortez, till at last I won to the coveted vantage-ground, and found myself staring out over a wide and varied strath that rolled ocean-like between the Otonabee and Indian River.

In the foreground, to the south, lay Burnham's wood, brimful as a magician's box with insect marvels I was to conjure forth next season. And east of there, after a mile or more of open country, the timber lands began again: at first just scattered farm lots of elm and maple, but, from a point in the middle distance, not far south of the C.P.R. there stretched across the background a wood far larger and denser than any of these; widening as it went, it spread to the south-east verge of sky in the form of an enormous fan. In view of its distance, this must, if continuous, be a veritable forest, and field glasses trained upon it revealed no break in all its surface; it stood the test—a solid fan of timber, ribbed with hemlock and spruce, fringed with pine, the framework compact of beech and maple.

Though I found enough to engross my attention next season, in the forefront of this woodland paradise, yet always in imagination loomed up that mysterious background; and when, in May of last year, I drew the covers of Burnham's wood repeatedly without a single view-halloo of novel game, elfin fingers from the far horizon, beckoning fast and furiously, would no longer be denied. So in the first week of June, with a fardel as varied as that of Autolycus, I set out across country for this wood of my desire and merrily hent the stile, as light-hearted and innocent a snapper up of unconsidered trifles as any son of Hermes in the land.

Like every fastness worthy the name, it had its approaches well guarded; for a mile or more along its northern frontier I probed vainly for a point of penetration; thickets of prickly ash, a broad belt of willow and alder, a meandering stream of uncertain channel, all combined to form a zariba moated and impervious. At last, by the north-east corner of the wood, the swamps drew to a narrow neck, and along an old winter road strewn with elm logs I stole my first entrance—the planet in the ascendant doubtless Mercury, lucky star of all pedlars and the light-fingered gentry.

No sooner had I crossed the threshold and won to the heart as it were of this dark tower of romance than I became the butt—the more than willing target—for a perfect bombardment of new discoveries. On one of the elm logs that had served me for drawbridge in the passage of the moat, I caught a gleam of steely blue about the corrugated bark. It was *Physocnemum brevilineum*, and I soon

found this interesting longicorn settling in considerable numbers on the logs. It had evidently lately emerged from its bores in the elms. I captured several pairs hidden under flakes of the bark, and about a dozen running along the logs after flight in the sunshine. Only once before had I taken this creature and that had been on the trunk of a standing elm, green and flourishing. It was, therefore, of interest to note that these logs were dead, and had been lying—some of them—for three or four seasons.

The excitement of this first find was hardly spent before I spied a newly emerged specimen of *Saperda tridentata,* slowly waving its antennæ and preening itself in the ecstasy of a first sun bath. The elm saperda is no doubt a common insect, and on summer evenings I have occasionally taken a stray specimen, attracted to light through an open window; but I had never before happened on its chosen breeding grounds. *Larvæ* and *pupæ* were frequent in the inner bark of several logs and stumps, and while it seemed emerging most abundantly in the first ten days of June (exactly the season of the basswood saperda), occasional specimens were taken throughout the month. This first day's bag tallied 17.

The winter road turned sharply west at the neck of the swamp, leading past a couple of woodpiles and a heap of brush. Here I captured (besides 3 more elm borers) 2 basswood borers, a fine specimen of *Callidium antennatum,* and (on a billet of white pine) a strange beetle that looked like a small *Criocephalus* or a light-colored, long and narrow specimen of *Asemum moestum;* it proved to be *Tetropium cinnamopterum:* evidently a rarity, for I have only seen one other; that was last July in the Algonquin Park, taken resting in shadow on the underside of a newly fallen white spruce.

In the middle of June I returned to the scene and right in the same tract captured on a basswood log *Pogonocharuss mixtus,* and my third specimen of *Hoplosia nubila.* The season of 1915, however, proved far from ideal for sun-worshippers, cold east winds more than countervailing the bright sunshine. It was on this second trip that I noted, at the north edge of the wood, some large bushes of thimbleberry crowded with sprays of bud that promised well. While following the winter road south through the heart of the wood I came across several patches of the rare striped coral-root in full bloom. Then, after crossing a couple of hardwood ridges, I descended to a rich piece of tamarac swamp, and groping my way through a dense mist of mosquitoes, along a track of sphagnum moss and decaying corduroy emerged at last on a gravel road intersecting the wood from west to east. Despite bloodsuckers and bogholes I was not empty-handed when I reached *terra firma.* From willow foliage I had gathered half a dozen specimens of *Lina scripta,* on a hemlock stump *Rhagium lineatum,* and in blossoms of buttercup and fleabane several specimens of *Anthaxia æneogaster* and *Leptura vibex.*

To the making and through the heart of as pretty a piece of landscape as you might find in all the Province went this gravel road; wooded on both sides and flanked on the north by a fringe of heaths—Labrador tea, andromeda and American laurel—all in bloom; on the south by a shallow ditch filled with marsh fern. To the west, at a bend in the road, the ditch was backed by a low escarpment of shaded bank, based with clumps of crested and prickly shield fern and occasional masses of giant osmunda; the whole forming a kind of natural ha-ha, behind which spread, well above swamp level, a hardwood of maple and beech. Due south at somewhat greater distance the woods climbed suddenly out of the swamp and rose rapidly to the sky-line, presenting to the enraptured eye tier above tier of balsam and silver birch, elm and maple, in the varied shades of lush soft green that mark

the leafy month of June. South-east alone, bounded on three sides by woods, you caught a glimpse of open meadow, a tiny wedge driven into the forest by the hand of man.

In the swamps of old Ontario, though the whole Dominion go dry, you may still drink deep of this wine of life, till you fairly reel with the beauty of it all. Over the road dragonflies hover and dart; butterflies flutter in varied hue, little Blues and Coppers and Hairstreaks; once in a while a great Fritillary or a Swallow-tail comes sailing along; far up in the vault of sky a pair of hawks wheel and poise, their faint keening, from that giddy height, falls feebly on the ear. From the depths of the swamp come at intervals the gentle croon of the Mourning Dove, the sweet, long-drawn whistle of the Whitethroat; presently, drowning all else, from some hidden turret in a Balm of Gilead showers down a flood of delicious music, sweeter than the carol of a robin, perhaps the notes of that master-singer, the Rose-breasted Grosbeak. Who could be blind and deaf to all this? Not even an entomologist in the last stage of "cerambyciditis." Mosquitoes and deer-fly are soon forgotten; indeed, when taken in bulk, as it were, they are much less of a nuisance than retailed in ones and twos; I had far rather move imperturbably through an open swamp, the pincushion for a thousand, than sit on a verandah and smash desperately at half a dozen, or crouch abjectly under canvas listening to the shrill slogan of one. In the open they are mere pin pricks and we can cry with happy-go-lucky Launcelot Gobbo—"Here are simple scapes! If fortune be a woman, she's a good wench for this gear."

Refreshed as by a draught of spring water I plunged once more into the swamp, following a woodman's path to the south of the gravel road. A little way in, the path bore to the right and at length debouched on a dry upland pasture west of the wood. Beside the path were a number of straggling shrubs of spiked maple, and the bloom was not quite over. In just such surroundings near Port Hope I had taken on these blossoms not a few beetles of interest and one or two of considerable rarity. Above all, a unique specimen of a small *Anaglyptus*, which had been declared in Montreal the male of *Microclytus gazellula*. Spiked maple, too, is the favorite haunt of *Corymbites hamatus*, a very prettily marked click-beetle. It was too late, however, and all I could find were a few specimens of *Leptura capitata* and *Callimoxys sanguinicollis*. But I marked the place in my mind for an early visit in 1916, and made my way home by the newly found gravel road, a forced and zig-zag course, uphill and downdale, along the claw of my spreading fan of woodland, past Burnham's, to the Lift Locks and the City.

In the fourth week of June I made my third visit to the Wood of Desire, holding to the gravel road till almost the end of the journey, when I skirted a fence due north to where the thimbleberry bushes grew. They were a snowy mass of blossom now, and two of the sprays, either from situation or from the greater maturity of their flowers, had quite a number of beetle visitors; among others a solitary *Leptura 6-maculata*, and (better still) along with two specimens of *Leptura proxima*—the first that season—behold! *Leptura chrysocoma*. This last I had never taken, though, two or three seasons before, I had heard of a lucky collector in Port Hope making quite a haul.

Altogether the experience of this first season served only to enshrine the Wood of Desire in my heart as a haunt that age could not wither nor custom stale. Again and again in fall and winter I found myself longing for the spring. Alas! its coming was advertised in the almanac weeks before it appeared, and it was actually Victoria Day before I exchanged New Year greetings with my inamorata.

Now perhaps it may spell for you a cozening fancy—the glamour of imagina-

tion—but so sure was I the mere sight of this wood must kindle in everyone longings ardent as my own, that I got together a picnic party to visit the place. The approach by the gravel road was admitted on all sides to be lovely, but just as we reached the outposts of beech and maple, our foremost team began to kick and plunge; we were ambushed, and next moment all our cavalry was thrown into confusion and we were hotly engaged in hand conflict with hordes of fierce mosquitoes. Further in, as I knew, the swamp was even denser; where horses were too restive to be tethered, it was impossible for bipeds (at least the petticoated variety) to bivouac in any comfort; so we beat a hasty retreat to the upland pasture. Here a strong wind, coming to our support, checked the advance of the foe; and here, much abashed, in the lee of a snake fence, we rallied our forces and sat down to an *al fresco* banquet.

A diner at Delmonico's would have turned up the nose at our bucolic bill of fare; but nature, kind indeed to all her children, added, in the keenest of outdoor appetites, a relish to this plain and homely food not a city in the world could supply; she even provided us, in true up-to-date style, with refreshing interludes of music; a rare treat, in the form of a series of solo selections. For without being closely attentive we were yet, throughout the repast, fully alive to what seemed the clear carol of a robin.

The song came from the leafy gable of a Balm of Gilead beside the road; the same hidden turret, the same sweet notes I had marked the June before. The very persistence of the song at last caught and held the attention of us all; closely studied it was certainly no robin's, being sweeter in quality and of far greater range; soft as the fluting of a bluebird, yet full and rich (almost) in tone as an oriole's, wonderfully varied, still more wonderfully sustained, came the notes of the singer, a silvery shower of sound. We managed, two of us, to draw close enough to note the bird's outline as he sat on a spray near the top of the tree; then, at length, he paused in his song and flew; as the wings were spread in his first movement we could see a streak of white across them.

It was indeed the Rose-breasted Grosbeak: a week or two later I had an opportunity of studying him at leisure through field-glasses as he sat on this his favorite perch—singing (doubtless) to a mate on the nest. The black of the head and throat, the white of the lower body, and in delicious contrast a splash of rich crimson on the upper breast, left no doubt of his identity, even had the vaulted boldness of his bill not been in evidence. Mr. Schuyler Matthews contends that the bird owes his power as a songster—a certain resonance and fulness of tone, perhaps—in some measure to the shape of his beak; nor need the contention be thought fanciful; the English bullfinch, for one, might be cited in support.

Some weeks later, when halcyon days had really come to stay, and I ventured to suggest to some of my friends that we forgather again at the Wood of Desire, they one and all refused. In their memory the song of the Grosbeak wakened no echo, but the winged darts of Liliputian hosts renewed all their venom, and my rambles since Victoria Day have been companionless.

If I were put in the witness box and cross-examined by some matter-of-fact plaintiff's counsel, many startling admissions would doubtless be made to appear: as, that the round trip involves no less than 15 miles of tramping; that often I have been so parched with thirst as to lie down and lap, at the girdling moat, water that was tepid and tasted of cows; that once, on venturing a few rods in towards an enticing nook, the gravel road I had left vanished (by some sinister necromancy) as completely as the highway out of which Childe Roland turned aside in his quest of the Dark Tower, and I was left for over an hour to wade knee deep and flounder

to the waist through mazy labyrinths of swamp; that no sooner had I escaped this involuntary dipping, than a thunderstorm came up and baptised me all over again, a cold douche and a shower (so to speak) being thrown in gratis on the top of the foot and hip baths already so lavishly provided; and again, that, early and late, mosquitoes and deerfly swarm there in countless myriads.

Damning evidence to you jurymen, perhaps; to me, proof positive of Mr. Bumble's famous apothegm, "The Law is a hass." One tithe the facts in the other scale of the balance would serve to kick the beam. Witness the troop of black squirrels I met, hotfoot at a game of tag; the little couple of fellow-entomologists I surprised, pouncing on ground beetles in the carpet of dead leaves, as pretty a pair of young skunks as you would wish to see anywhere; the bittern I watched stalking frogs, with all the cunning and the zest of a human hunter; the hen partridge that held me at bay to cover the retreat of her brood; the whip-poor-wills, flitting in ghostly silence from their nesting place; the grosbeak, in his leafy hermitage, all its belfries a-peal with melody; to say nothing of the flower-clusters of chokecherry I found, sheltering in their midst the rare little *Anaglyptus* I had vainly sought for eight years and now took nearly a score of; and the wind-fall of beech trees I happened on last July—an illustration (come to think of it) of the struggle for existence, no less striking, if less gruesome, than the fly-blown carcase already writhing with new life of an alien order—three giant beeches, thrown in some titanic westling-bout with Boreas, their dying shafts alive with Longhorns, Buprestids and other brooding insects; gangs of pigmy foresters, drilling, boring, and charging, "throng" at their self-imposed task of wood-scavenging; strange medley of life in death, such as fed the melancholy of Shakespeare, when he wandered, moralising, with Jacques through the Forest of Arden.

These and a score of other scenes remain, tapestried in the rich brocade of memory; while all the tale of misadventures has long faded into nothingness. Every trip I made last June and July brought me home at nightfall, footsore indeed, but laden with treasure-trove, and eager for the morrow's sun, to light up once more that land of glamour, elf-haunted still and fraught with mystery, the Wood of Desire.

INSECTS AS MATERIAL FOR STUDIES IN HEREDITY.

W. Lochhead, Macdonald College.

For some years I have given attention to problems of heredity, and have been impressed with the importance of the place insects have taken in the solution of some of the problems. I thought, therefore, that it might be of interest if I brought together the many scattered references in current literature to the investigations that have been made with insects.

Tower's Experiments.

No question in heredity has been more keenly discussed than "Are acquired characters transmissible?" The neo-lamarckians assert that characters impressed upon an organism by its environment may be and often are transmissible. Weismannists, on the other hand, maintain that such characters are never transmitted. Tower's investigations set forth in "An Investigation of Evolution in Chrysomelid Beetles of the Genus Leptinotarsa" (Carn. Inst. Publ. No. 48) are interesting in this connection. He subjected beetles, when their reproductive

organs were developed to a certain stage, to unusual conditions of temperature and moisture. As a result variations appeared in the offspring in regard to color markings and certain details of structure. These variations, moreover, were not all alike; some were immediate, others appeared after a time; some of the germ cells were affected, others were not. But the important point was that the variations produced did not revert to the original parent forms in subsequent generations. These experiments indicated that *environmental stimuli may, under certain conditions, produce germinal variations.*

Standfuss and Fischer, by changing the temperature and food of the larvæ of Vanessa and Arctia, induced in the following generations certain variations which persisted even when crossed with the parent form.

The investigations of Johannsen, of Copenhagen, with Pure Lines of beans and barley showed that variations within a Pure Line are not inherited, and that they have little or no influence on the permanent improvement of a race. In Tower's experiments with Pure Lines of the Colorado Potato Beetle (*Leptinotarsa 10-lineata*) dark to light colored variations appeared in the same Pure Line. When dark males and females were mated the progeny were not dark, but they fluctuated about the average of the Pure Line, even after twelve generations of such mating. *Tower's results, therefore, confirm the conclusions reached by Johannsen.*

Selection Value of Variations.

Darwinism has been criticized on the ground that variations often occur which cannot possibly be of value to their possessors in the struggle for existence. Kellogg and Bell in their "Studies of Variation in Insects" made a careful scrutiny of the color patterns of 1,000 specimens of *Hippodamia convergens* and found 84 aberrations of pattern varieties, ranging all the way from no spots to eighteen spots, although twelve is the species character. If some of the intermediate patterns should disappear the systematist would have data for making several new species. Other forms studied showed variations in antennal structure, spinal armature of tibiæ, and venation. The conclusion is that "continuous" variations are in all probability not the foundation stones of new species. This view has of course been emphasized by De Vries, Johannsen, Morgan and others.

Examples of Mendelism.

Toyama's experiments with Siamese silk moths are interesting. He paired a moth with yellow cocoons with one having white cocoons. The offspring produced only yellow cocoons. In the next generation some of the cocoons were yellow and some were white in the proportion of 3 to 1. The whites bred true, while the yellows broke up again, yellows and whites in the usual ratio.

Miss McCracken's work with spotted and black varieties of *Lina lapponica* is also confirmative of Mendel's laws, the spots being dominant and the black recessive.

Coutagne, 1902, found that when a silk moth whose larvæ had transverse stripes was crossed with one whose larvæ were white, the striped form was dominant. Toyama also found the striped form dominant.

Standfuss's experiments in crossing the moth *Aglia tau* with its dark variety *lugens* do not harmonize with those of Doncaster with Abraxas. The dark color of *lugens* was dominant over the light color of *tau*, but in subsequent matings of heterozygous *lugens* and with *tau* the results were such that cannot be brought into line with Abraxas.

Lutz found that when a normal *Crioceris asparagi* with three yellow spots on blue-black elytra was crossed with a variety where the upper spot was united with the middle one, the normal form was dominant. Intermediate conditions occur, but these may be heterozygous forms.

In-Breeding.

Darwin's memorable work on cross-fertilization with morning-glories, pansies, cabbage, lettuce, buckwheat and beets showed conclusively the value of cross-fertilization over self-fertilization in the maintenance of the vitality of these plants. But it has also been shown that many self-fertilizing plants, like tobacco, wheat and barley, are vigorous and have retained their vigor for thousands of years. Dr. East says very properly that Darwin's phrase "Nature abhors perpetual self-fertilization" should read: "Nature resists any sudden change in long established conditions."

Regarding the effects of in-breeding among animals differences of opinion exist, but Mendelism has cleared away some of the difficulties. It shows that in-breeding in itself is not necessarily injurious, but great care must be exercised to prevent injury. The duplex dose of determiners develops prepotency in all characters, good and bad alike.

Castle in-bred Drosophila for about sixty generations without any appreciable loss of vitality.

The Sex Chromosome.

On account of the fact that approximately the same number of males and females of the human species are born, students of heredity have suspected that sex is a character dependent upon factors which act in a Mendelian manner. The explanation of this equality of sexes was forthcoming by comparatively recent researches in which insects played an important part. Henking, in 1890, discovered two kinds of sperm cells in the firefly, *Pyrrhocoris*. McClung, in 1902, found two kinds of chromosomes in the sperm cells of the grasshopper. Stevens, in 1905-1908, found accessory chromosomes in certain species of aphis and Diptera. Wilson, in 1905-1907, discovered different kinds of chromosomes in certain Hemiptera; and Morgan, in 1908, described two kinds of sperm cells in Phylloxera. Later researches by Doncaster, Raynor, Morgan and others have extended the list.

This accessory chromosome has been called the *sex* or *X chromosome* inasmuch as its presence in the germ cell is believed to determine the sex of the offspring. In most animals, including man, all the female germ cells contain an X chromosome, while it is present in only half of the male germ cells. On the other hand, in chickens, ducks, canaries, and in the English currant moth (Abraxas) all the male germ cells, but only half the female germ cells, contain the X chromosome.

In the first case investigations have revealed the fact that when fusion occurs between an egg and a sperm, both containing an X chromosome, the result is a female, but when an egg and a sperm without an X chromosome fuse the fertilized egg has only one X chromosome and the result is a male. In fertilization, therefore, the chances are that approximately an equal number of males and females are produced, as shown by diagram:

O = egg cell; S, sperm with an X chromosome.
s = sperm without an X chromosome.
Z = zygote with two X chromosomes.
z = zygote with one X chromosome.

		S	s	
Female gametes	O	Z	z	= male gametes.
	O	Z	z	= 2Z + 2z, giving an equal number.

In the second case where the female is heterozygous for sex and the male homozygous, the chances in fertilization are again approximately an equal number of males and females.

O = egg cell with an X chromosome.
o = egg cell without an X chromosome.
S = sperm cell with an X chromosome.
Z = zygote with two X chromosomes (male.)
z = zygote with X chromosome (female.)

		S	S	
Female gametes	O	Z	Z	= male gametes.
	o	z	z	= 2Z + 2z, an equal number of males and females.

Heredity in the Aphids and Bugs.

The life-history of aphids is well known. The fertilized egg hatches out a female, the stem-mother, the following spring, followed by a succession of generations of females. On the approach of autumn a brood of sexual males and females appears. The explanation of these phenomena is not clear, but some progress has been made in clearing the mystery. Morgan has shown that the spermatids of Phylloxera are of two kinds, but those containing no accessory chromosome degenerates. Consequently only those containing an accessory chromosome take part in fertilization, and the fertilized eggs produce females. The problem of the production of the males parthenogenetically, however, at the approach of autumn has not yet been solved. It is probable, however, that external or environmental factors are to some extent responsible. In *P. caryæcaulis* one stem-mother gives rise to the line ending in sexual females, and another stem to the line ending in the males. On the other hand in other species of Phylloxera and in many aphids the same stem-mother may produce both lines.

In this connection it is interesting to observe the production of males and females among bees, wasps and ants. It is well known that fertilized eggs of the queen bee produce females, and unfertilized eggs males. The mature egg has one sex chromosome, consequently the male cell has but one, but when the egg is fertilized by a male cell and product has two sex chromosomes, characteristic of the cells of a female bee.

Foote and Strobell have recently made interesting studies of two species of *Euschistus*. The male of *variolarius* has a well-defined black circular dot on the sixth segment of the abdomen, but in both sexes of *servus*, the other species, the spot is absent. When a female *variolarius* was crossed with a male *servus* many of the F_1 hybrids showed the spot. Again, the cross between a pure male *variolarius* and the F_1 female and spot appears. In the F_2 generation some specimens showed the spot, while others did not. A satisfactory explanation of the inheritance has not yet been given.

Experiments with the English Currant Moth.

The work of Doncaster and Raynor (1908) in connection with the crossing of two varieties or sub-species of Abraxas, *grossulariata* and *lacticolor,* was important in that it furnished additional evidence that certain characters are sometimes linked up with sex or with the sex factor. For example, color-blindness in man seems to be linked up with sex. Men cannot hand on the defect without having it, whilst women can. Doncaster and Raynor's results are explained on the assumptions that the female is heterozygous for sex, femaleness being dominant, the male a homozygous recessive, and the factor for color for *grossulariata* is dominant. The gametic formulæ for the crossings are given below:

C. = dominant factor for color (grossulariata.)
c. = recessive factor for color (lacticolor.)
F.f. = sex factors in female.
F.F. = sex factors in male.

Case I. Grossulariata (male) x lacticolor (female).

Female gametes	CF	CF
CF	Gross. male	Gross. male
cf	Gross. female	Gross. female

= male gametes.

= all grossulariata (heterozygous) 50% female, 50% male.

Case II. F1 Grossulariata (male) x F1 Grossulariata (female).

Female gametes	CF	cF
Cf	Gross. female	Gross. female
cF	Gross. male	Lact. male

= male gametes.

= 50% grossulariata females (½ normal, ½ heterozygous). 25% gross. males (heterozygous, 25% lacticolor male (normal).

Case III. F1 Grossulariata (male) x lacticolor (female).

Female gametes	CF	cF
cF	Gross. male	Lact. male
cf	Gross. female	Lact. female

= male gametes.

= 25% gross. female (heterozygous), 25% gross. male (heterozygous), 25% lact. female (normal), 25% lact. male (normal).

Case IV. Lacticolor (male) x F1 Grossulariata (female).

Female gametes	cF	cF
Cf	Gross. female	Gross. female
cF	Lact. male	Lact. male

= male gametes.

= 50% gross. heterozygous females. 50% lact. heterozygous females.

An interesting case arose in the reciprocal of Case I when a pure wild grossulariata (female) was crossed with a lacticolor (male). The result was the same as in Case IV, showing that the wild grossulariata female is heterozygous with regard to that color.

Experiments with the Pomace Fly.

Morgan's recent investigations with hybrids of *Drosophila ampelophila*, the common pomace fly, have added much to our knowledge of factors in heredity. He found that each visible character is due to the action of a number of factors in the germ plasm, each factor in turn influencing a large number of other traits. Moreover, these factors are linked together in groups, in chromosomes, where they are arranged in a linear series, sometimes changing places by crossing over. With Drosophila, which was normally red-eyed, there appeared in the course of breeding experiments as many as 25 distinct mutations in this eye-color. Morgan supposes, therefore, that at least 25 factors are concerned in the production of this red eye, and that when a single one changes a different color is obtained. This one factor, however, may be called the *unit* factor for this particular color, so it may be treated in a simple Mendelian factor in segregation. The following examples illustrate one of the simpler cases of inheritance:

Case I. Red-eyed (female) with white-eyed (male).

Female gametes	rF	rf	= male gametes.
RF	Red-eyed female	Red-eyed male	Progeny all red-eyed.
RF	Red-eyed female	Red-eyed male	

The diagram of the F_2 generation is:

Female gametes	RF	rf	= male gametes.
RF	Red-eyed female	Red-eyed male	= 50% red-eyed females. 25% red-eyed males.
rF	Red-eyed female	White-eyed male	25% white-eyed males.

Case II. White-eyed (male) x F_1 red-eyed female (heterozygous).

Female gametes	rF	rf	= male gametes.
RF	Red-eyed female	Red-eyed male	= 25% red-eyed females. 25% red-eyed males.
rF	White-eyed female	White-eyed male	25% white-eyed females. 25% white-eyed males.

Case III. Red-eyed (male) x white-eyed (female).

Female gametes	RF	rf	= male gametes.
rF	Red-eyed female	White-eyed male	= 50% red-eyed females. 50% white-eyed males.
rF	Red-eyed female	White-eyed male	

showing that the red-eyed male parent is heterozygous for color.

Case IV. Red-eyed (male) x F_1 red-eyed (female) heterozygous.

		RF	rf
Female gametes	RF	Red-eyed female	Red-eyed male
	rF	Red-eyed female	White-eyed male

= same as the F_2.

If a white-eyed male Drosophila is mated to a red-eyed female the offspring are red-eyed. If these are in-bred all the F_2 daughters are red-eyed, but half the sons are white-eyed. "In a word, the grandfather transmits his characters visibly to half of his grandsons but to none of his granddaughters." (Morgan.)

R = dominant unit factor for red eye color.
r = recessive unit factor for white eye color.
F.F = sex factors in female.
F.f = sex factors in male.

The experiments of Morgan and his colleagues with Drosophila are perhaps the most important in recent genetic research. They are valuable both by reason of the large number of specimens under observation and on account of the significance of the results. Bateson says: "If we accept the whole scheme of interpretation without reserve we are provided with a complete theory of heredity, so far as proximate phenomena are concerned."

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AN HISTORICAL ACCOUNT OF THE FOREST TENT CATERPILLAR AND OF THE FALL WEBWORM IN NORTH AMERICA.

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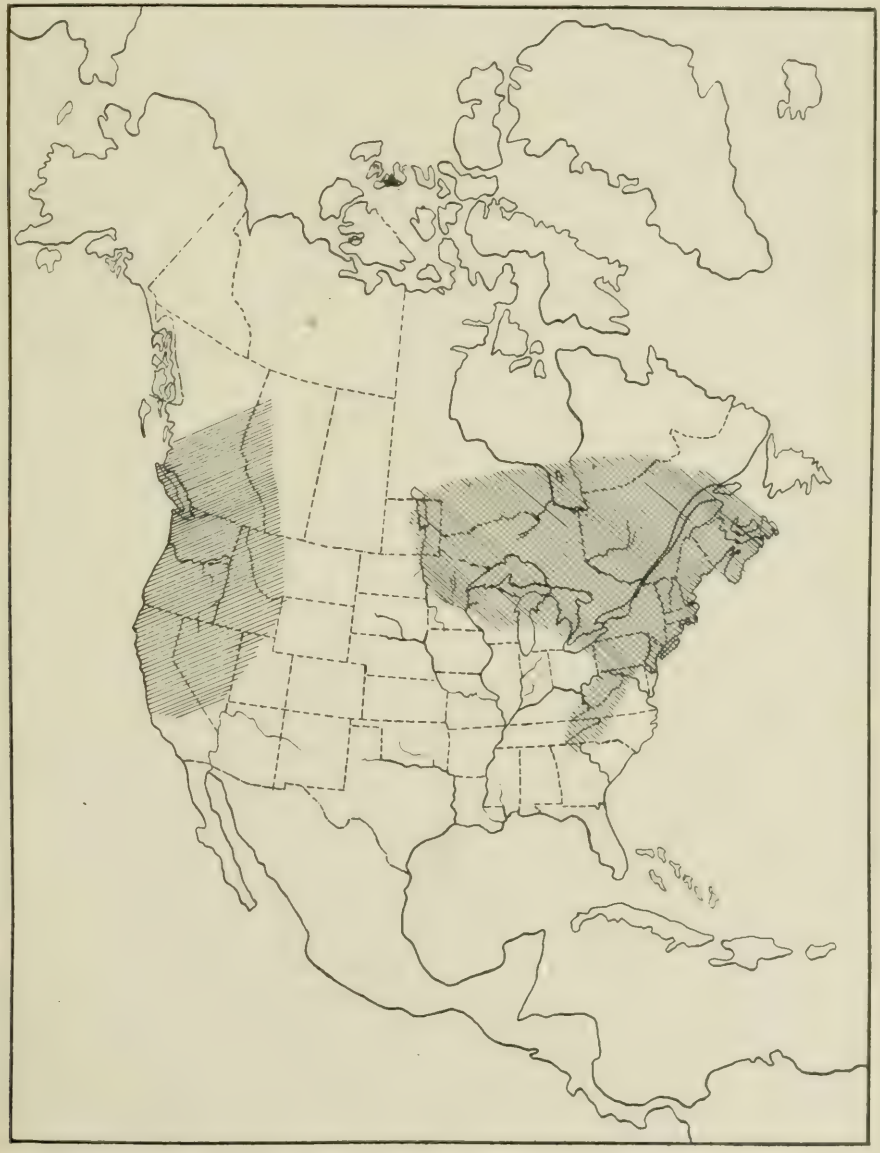
Introduction.

Since 1911, the Entomological Branch of the Dominion Department of Agriculture has been conducting a study of the natural control of two common insects that from time to time are very injurious to forest, orchard, and shade trees throughout the Dominion. The work is being carried on from the Fredericton



Map of North America, showing the three regions referred to in the text.

laboratory by Mr. J. D. Tothill and his assistants, and is under the general direction of the Dominion Entomologist, Dr. C. Gordon Hewitt.

The insects in question are the Forest Tent Caterpillar and the Fall Webworm. The object of the work has been to study the control of each insect at the same places for a period of consecutive years. The work has resolved itself into a study of the causes of outbreaks of these and other insects, and of the factors that in the natural course of events, cause these outbreaks to subside.

In 1911, when the study was commenced, both the Forest Tent Caterpillar and the Fall Webworm were exceedingly abundant, and were doing great damage throughout the Eastern United States and Canada. Since then they have become less and less numerous and in 1915 there remained only a few local infestations and practically no damage was reported.

This story of great abundance followed by a period of scarcity is merely a repetition of a story that has been told and retold many times in the past history of this continent. It is the purpose of this paper to give an historical account of these two insects as gleaned from the records of the White Man written during his few centuries of residence in this land.

For the purposes of this account it has been found convenient to divide the continent into three regions. On the map (p. 73) these are indicated, the Eastern and Western being marked with parallel lines and the Central occupying the intervening territory. The Regions are treated separately. The accounts of these insects are much more complete and satisfactory for the Eastern Region than for either of the others. A glance at the charts (pp. 76, 81) will show to what extent the abundance of the insects has been uniform for the three Regions.

In these charts the term "local ravages" has been used to designate outbreaks which are recorded as occurring only in smaller sections of the main divisions, or Regions. As will be noticed these outbreaks occurred largely previous to 1860, and there are at least two explanations for their seemingly local distribution: (1) The limited number of observers recording such data prior to that time and (2) The more or less limited food supply of the insects. It seems quite probable that the food plants of both species, but especially of the Forest Tent Caterpillar have greatly increased with the spread of civilization. This question is, however, too many-sided to permit of a full discussion here and will be left for another paper, dealing with this subject, which it is hoped will be published from the laboratory at a later date.

The author wishes to take this opportunity of thanking Dr. C. J. S. Bethune, Professor of Entomology at Guelph, for his kindly assistance in connection with the library work at Guelph. He also wishes to thank Mr. Tothill for his many helpful suggestions and kindly criticisms.

Forest Tent Caterpillar.

Eastern Region.

The original habitat of the Forest Tent Caterpillar in North America seems to have been in the Eastern Region, for it is here that we find its ravages first recorded.

The first authentic record of the presence of the Forest Tent Caterpillar is that compiled from earlier observations by Mr. Abbot and published by Sir J. E. Smith in 1797 in his 'Lepidopterous Insects of Georgia.' He gives good colored figures of the larva and imago, and states that "This kind is sometimes so plenti-

ful in Virginia as to strip the oak trees bare but is rather rare in Georgia." This makes it certain that there were outbreaks of the insect, in Virginia at least, previous to 1797; and that it was not so abundant farther south. As early as 1791 there was an outbreak of an insect in Vermont which was probably the Forest Tent Caterpillar, and may have been a part of the last outbreak noticed by Mr. Abbot in Virginia.

We have no further record of the insect until 1820, when it was noticed in Massachusetts. In the 'Entomological Correspondence of T. W. Harris,' we find a description of the species and the following notes on its history, "The moths appeared about the last of June, 1820. . . . One cast its skin June 13th and came out an imago July 1st, 1821." "Found the larvæ on the apple tree, June 3rd, 1826." Harris again mentions it in his "Treatise on Insects," 1841, and publishes an account of it in the "New England Farmer," 1844, which would indicate the presence of the caterpillar in Massachusetts at that time.

The earliest authentic record of an outbreak in New York is given by Fitch in his Second 'Report of the Insects of New York,' pp. 198-199. He says, "his neighbors state that this species gnaws the stems of young apples causing them to fall as well as eating the leaves." This was probably a part of the same outbreak as that recorded from New Hampshire in 1854 by Eaton ('Trans. N. H. State Agr. Soc.' 1854-1855, pp. 199-207). There is evidence that small outbreaks had previously occurred in New York for in the *Country Gentleman* of 1861 (Vol. 45, p. 299) "Acer" says with reference to this species, "These insects have disappeared three times during the last thirty years." The first of the outbreaks thus implied probably occurred between 1826 and 1830, the second between 1840 and 1844, the third was the one referred to by Fitch and Eaton.

In his 'Fifth Report of the Insects of New York,' 1859, Fitch says of these caterpillars, "a few are seen every year and occasionally there is a season when they are more common but never numerous." He also states that they were about the same in Baltimore, nothing approaching stripping having been known in that vicinity in his generation.

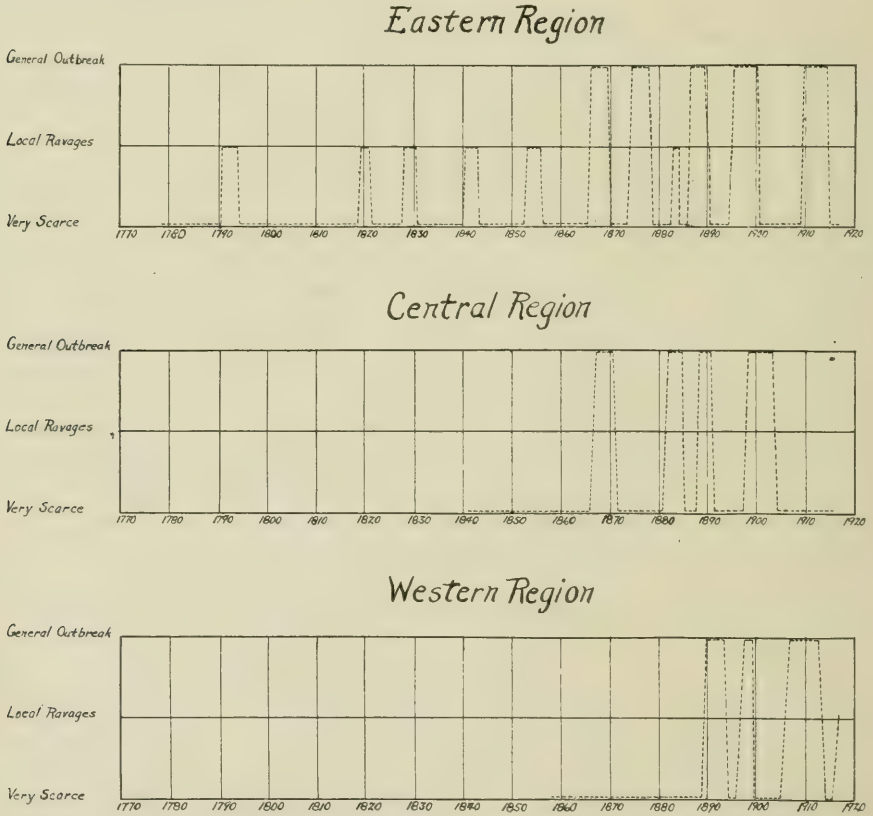
The *Country Gentleman* of 1868, makes several references to the severe outbreak of that year in New York. The caterpillars were reported as "more numerous and destructive in New York State than ever before," and it is also stated that "they have twice disappeared in this place."

From the foregoing notes on its history we have reason to believe that the ravages of the Forest Tent Caterpillar were not very severe previous to 1859, as there is no record of stripping except that by Smith and Abbot, concerning the oaks in Virginia. These ravages were probably restricted to a few of the northeastern States. We note, however, that the insect was present previous to 1797, that there were outbreaks of a more or less serious nature in Massachusetts in 1820; in that State and in New York between 1826 and 1830; again between 1840 and 1844; and about ten years later in New Hampshire and New York.

The next outbreak, noted in the *Country Gentleman* of 1868, was much more widespread and severe than any of the preceding. Its ravages now extended over the entire region. The editor of the *Canada Farmer* reported "many orchards defoliated" near Toronto in June of that year. Walsh (*Practical Entomologist* 2, pp. 112-113) noted its occurrence "in large numbers" in the orchards in Maine in 1866 and in the following year on oak in Virginia and in orchards in New York. Brackett[1] reports their ravages in Maine in 1867. Riley in his

[1]1867. Brackett, G. E., Am. Journ. of Hort., Sept., 1867.

'Third Report of the Insects of Missouri,' recorded them as very destructive in the Eastern States in 1867 and 1868. In his second Report in 1870, he says regarding the caterpillars, "For a number of days last June in Western New York they might have been seen marching single file up the railroad track on Pilot Knob in the scorching rays of the noon day sun." Bethune ('First Ann. Rep. Ent. Soc. Ont.,' p. 15) reported them as very abundant in Western Ontario in 1870, but said they had decreased east of Toronto. In 1872 Saunders says of the same district ('Can. Ent.,' 4, p. 134) "We have not met with a single full grown specimen this year although in years past they have swarmed on our trees and fences." This outbreak thus covered a period of about five years, 1866 to 1870, and the resultant damage was very much greater than any previously reported from this species.



History of the Forest Tent Caterpillar in North America. The dotted lines indicate the abundance of the insect.

Four years after their disappearance, Mr. H. H. Lyman, of Montreal, published an account of the unusual abundance of the insect. In the *Canadian Entomologist,* Vol. 6, p. 158, he says, "The caterpillars of this pest are swarming on almost every description of tree or shrub in the vicinity, many trees being completely denuded of foliage."

This was the first notice of another outbreak and the following notes throw some light on its severity and distribution. "The Forest Tent Caterpillar was excessively abundant and destructive to fruit and forest trees in many parts of

Ontario." (Bethune, 'Ann. Rep. Ent. Soc. Ont.,' 1875, p. 7). "Very serious ravages of this insect in Maine during the past two years," (Fernald, 'Agr. Maine,' 1875-1876, pp. 19-21). "Millions upon millions of them in Western Ontario," (Saunders, 'Ann. Rep. Ent. Soc. Ont.,' 1877, p. 4). "Very active and on constant parade over shrubs, fields, orchards, and gardens. They are recruited so plentifully from the forests, that we fairly sicken of the fight and despair of the prospects of victory," ('Gott, Ann. Rep. Ent. Soc. Ont.,' 1877, p. 41). "Had a fire passed through our orchards it could not have left our apple trees under more barren poles," (Burnet, 'Rep. Fruit Growers' Assn. Ont.,' 1877, p. 10). "Not so numerous as last year. . . . Mites destroyed many of the eggs and severe frosts in May, fungus diseases, parasites and birds, killed off many of the larvæ," (Saunders, 'Ann. Rep. Ent. Soc. Ont.,' 1878, p. 5 and pp. 28-30). "The tent caterpillars have almost entirely disappeared," (Saunders, 'Ann. Rep. Ent. Soc. Ont.,' 1880, p. 9). In these notes we have given very briefly the story of this outbreak which extended from 1874 to 1878 and did enormous damage over the greater portion of the Eastern Region.

In the year 1884 the insect was reported as very injurious in New Brunswick and Nova Scotia by Fletcher ('Rep. Ent. and Bot.,' 1885, p. 32). It was also referred to by Packard in the 'Fifth Report of the U. S. Entomological Commission,' pp. 117-118. This outbreak seems to have been quite local in character, but may have been the beginning of the next general outbreak, which began to attract attention in Vermont in 1886, when Lintner reported it as causing considerable injury to apple trees in that State. By the following year its ravages had spread over the entire Eastern Region, and in fact over the entire continent. Fletcher ('Rep. Exp. Farms, Canada,' 1887, p. 29) says, "The tent caterpillars were in great abundance all over Canada during the past season and seemed to attack almost every kind of deciduous tree." In 1888 it was reported as abundant in Maine ('Me. Agr. Exp. Stn. Rep.' 1888, p. 161) and the following year its ravages in that State were extremely severe. Most of the orchards and all the poplars, oak, cherry, and many other deciduous trees were completely defoliated in several sections, and railway trains were held up on several occasions for two and three hours at a time, by the innumerable legions of them crossing the tracks. Riley and Howard 'Insect Life,' 2, pp. 58-59). The same year Caulfield (Montreal) reports them as "all too common on our forest trees," ('Ann. Rep. Ent. Soc. Ont.,' 1889, p. 64). This was the end of the general outbreak for Bethune on page seven of the "Annual Report of the Entomological Society of Ontario," 1890, says "The tent caterpillars have been remarkable for their absence or rarity in all parts of Ontario." Only two local infestations are recorded that year, one being in the Penobscot Valley, Maine ('Me. Agr. Exp. Stn. Rep.,' 1890, p. 138), and the other in Washington County, New York (Lintner, '6th Rep.,' p. 106).

In 1891 a very severe local infestation was reported by Riley and Howard ('Insect Life,' pp. 477-478) on oak and gum trees in Carolina during which train traffic was seriously interfered with for several days.

In 'Bulletin No. 76 of the Vermont Agricultural Experiment Station' (1900) Perkins says that the insect began to attract attention in Vermont in 1895, and its ravages on maple became very extensive the following year, but it was not until 1897 that we again find general mention of the ravages of this pest. In that year Fletcher[1] reports them as "so abundant at Ottawa that they actually

[1]1897. Fletcher, Ann. Rep. Ent. Soc. Ont., p. 34.

starved themselves out by stripping." Harrington (Ont.) also reports the appearance of the caterpillars "in great numbers" on poplars and other trees. Perkins[1] in the same year reports it widely distributed over Vermont, many woods and orchards being entirely stripped. Their depredations were even more severe the following year, when Fletcher says ('Ann. Rep. Ent. Soc. Ont.,' 1898, pp. 84-85) "the Tent-caterpillars have been even more abundant than last year in almost every Province of Canada." Hutt and Moffat, ('Ann. Rep. Ent. Soc. Ont.,') both report them being so abundant as to interfere with the running of trains in many parts of Ontario. Their excessive destructiveness is reported by Weed in New Hampshire ('Bull. N. H. Agr. Exp. Sta.,' No. 59, pp. 199-201). Felt in his Fourteenth 'Report of the State Entomologist of New York,' says, "the ravages of 1897 and 1898 have been unprecedented in the annals of the State." In 1899 he[2] reports serious outbreaks, particularly in the Catskill Mountains and in the borders of the Adirondacks. "Ten cents per quart," he says, "were offered for the cocoons in many villages." The reports of Lowe ('Geneva N. Y. Bull.' 159) and Slingerland ('Cornell Exp. Sta. Bull.,' 170, pp. 559-564) corroborate those of Felt. Perkins[3] reports very great damage in Vermont in 1898 and 1899 and also states that "There have been occasional outbreaks since 1791, but the ravages of the present exceed any of the past both here, and in New York, Maine and Canada." Similar reports from other sections clearly point to this outbreak as exceeding both in severity and in extent, the ravages of any of the preceding ones. In 1900, the outbreak subsided, and in 1901 the caterpillars were reported as very scarce, all over the country. Three years later in the 'Annual Report of the Entomological Society of Ontario,' Fletcher states "not a moth or caterpillar of this species was seen at Ottawa this year," and in 1905, Evans ('Ann. Rep. Ent. Soc. Ont.,' p. 50) says, "The Tent caterpillar seemingly has disappeared entirely."

The insect did not again become numerous until 1910 when Hewitt ('Ann. Rep. Ent. Soc. Ont.,' p. 29) reported its occurrence in very large numbers in the Eastern Provinces and British Columbia. This marks the beginning of our latest outbreak in the Eastern Region, and its ravages are too well known by this generation to require much discussion here. Gibson reports hordes of the caterpillars and says, ('Ann. Rep. Ent. Soc. Ont.,' 1912, pp. 15-16) "It is the most remarkable outbreak of an injurious insect on record at Ottawa," and further stated that in the Gatineau Valley especially near Chelsea, many trains were held up, the evening passenger trains having been forced to use two and sometimes three engines in order to get along at all. Lochhead reported it equally bad in Quebec and their depredations were just as severe in New Brunswick and the Eastern States. Their ravages began to decrease in 1914, and in 1915 the insect had practically disappeared.

Central Region.

There seems to be no record of the Forest Tent Caterpillar in the Central Region until 1867, but it had no doubt been present in greater or less numbers for some time previous to this.

In his Third 'Report of the Insects of Missouri,' Riley reported this species as very destructive in 1867, and also the following year, in Arkansas and Missouri. The *American Entomologist,* Vol. 1, p. 208, records an outbreak of the insect in

[1]1897. Perkins, G. H., Vt. Agr. Exp. Sta., Bull. No. 60, p. 529.
[2]1899. Felt, E. P., Bull. No. 20, N.S., U.S. Div. Ent., pp. 60-62.
[3]1900. Perkins, G. H., Vt. Agr. Exp. Sta., Bull. 76, pp. 113-137.

Missouri in 1869, and in Vol. II of the same publication (1870) Riley states that the infestation was severe in Arkansas and Illinois, both that year and the preceding, and that it had been very destructive in Missouri during the past three years. Riley again reports it, ('Report Insects of Missouri,' VIII, pp. 22-26) as sometimes appearing in countless numbers in the oak forests of the South, and says, that in 1872 it was so abundant at Memphis, Tennessee, as to hold up trains on several occasions.

It may be well here to note that the above-mentioned outbreak was co-incident with the first general outbreak in the Eastern forests.

No further ravages of the insect are recorded until 1883, when Forbes reports them ('Thirteenth Ann. Rep. of the Illinois State Ent.,' 1883, p. 10) as having made a frightful inroad upon the apple orchards in Southern Illinois. He also mentions the same outbreak in his Seventeenth 'Report of the Insects of Illinois,' 1885, p. XIII. In his Fourth 'Report of the Insects of New York,' Lintner refers to this infestation in Illinois and states that it was arrested by a contagious disease known as muscardine.

As previously noted in the history of the Eastern Region, Fletcher, in 1887, stated that the Tent Caterpillars were in great abundance that season all over Canada so they were in all probability present in the Central Region or in the northern part of it at least. Bruner notes their occurrence ('Neb. Agr. Exp. Sta. Bull.,' 14, pp. 33-38) in Nebraska in 1890, and says they are frequently met with upon the prairies several miles from natural groves. In 1891, Murtfeldt ('U. S. Div. Ent. Bull.,' 26, pp. 40-41) reported a remarkable outbreak in Minnesota. She says the papers reported armies of them throughout the forests of the North-west, and a large portion of the forests were defoliated as well as many orchards.

The next outbreak recorded is in 1898, when Pettit[1] reports a severe infestation in some parts of Michigan. The same year Lugger ('Minn. Agr. Exp. Sta. Bull.,' 61, pp. 194-199) said the insect was fairly abundant in Minnesota, being more common than the Orchard Tent. Three years later, in the "Annual Report of the Entomological Society of Ontario," p. 119, Gregson states that the caterpillars were abundant that year in Assiniboia, and the insect was recorded for the first time, in Red Deer and Lacombe districts. Hudson[2] found a brood on *P. tremuloides* at Millarville, Alberta, in 1902; and Fletcher ('C. E. F. Report,' 1904) mentions finding what he thought was this species near Edmonton, "The moths," he states, "were in thousands just emerging." From these notes we would infer that the outbreak was quite general over the Central Region.

The infestation which was so severe in the Eastern Forests from 1910 to 1915, does not seem to have extended its ravages to the Central Region, and no further outbreaks have so far been recorded.

Western Region.

No information is available concerning the early history of this pest in the Western Region. The first reference to it is found in Saunders' "Insects Injurious to Fruits," published in 1883. In this he gives an account of the Forest Tent Caterpillar, and states that it is often very abundant in the West. This does not give us definite data concerning any outbreak, but assures us that the insect

[1]1898. Pettit, R. H., Mich. Agr. Exp. Sta., Bull. 175, pp. 349-350.
[2]1906. Dod, F. H. Wolley. Canadian Entomologist, XXVIII., N.o 2, p. 54.

was present for some time previous to that date, and that it was not so abundant some years as in others.

The first authentic record of an outbreak is given by Koeble, who states, ('U. S. Div. Ent. Bull.,' 23, p. 42) that this insect was found very abundant on Crataegus, alder, hazel and other trees in Washington in 1890. The same outbreak is recorded two years later, in the Third 'Annual Report of the Horticultural Society of British Columbia,' where it is stated (pp. 83-84) that "in some old orchards the foliage was entirely devoured." Also in the Third 'Report of the B. C. Department of Agriculture,' p. 1840, Mr. Wiltshire writes, "last year there were billions of these creatures and they completely stripped the crab-apple trees. This is the first year we have found them in the orchards." Dyar gives a full description of the insect in 'Psyche,' 6, 1892, stating that it was abundant in the valley of Columbia, and that in Portland, Oregon, many trees were defoliated by the larvæ. In 1894. Washburn, ('Oreg. Exp. Sta. Bull.,' 33, p. 16) records it as very abundant in Oregon, and the same year it was also reported as causing serious damage in many sections of British Columbia. From the foregoing notes we see that this outbreak was quite general over the Western Region and its ravages extended over a period of about five or six years.

Two years later, its presence was again reported in British Columbia, and the infestation had become very severe in 1898. In his 'Annual Report' for that year, Fletcher reports "countless thousands" of them, especially around Victoria and Agassiz, and, that many of the larvæ were parasitized and diseased. The following year only a few caterpillars were seen.

The history of the next outbreak is given by Tom Wilson in the 'Proceedings of the B. C. Entomological Society,' 1914, p. 37. He notes a slight infestation in 1907. The following year, a severe outbreak occurred from Washington and the United States boundary northward. In 1909 the infestation was doubled, and during the next two years enormous damage was done by the caterpillars. In 1912 the outbreak subsided and the following year they had nearly all disappeared. This outbreak thus seems to have extended over the whole of the Western Region, and its ravages greatly exceeded any previously recorded.

In 1915, the insect again began to attract attention in British Columbia, and this summer quite extensive ravages were reported on Vancouver Island. This infestation probably marks the beginning of another outbreak throughout the Western Region.

Fall Webworm.

Eastern Region.

Like the preceding insect, the Fall Webworm seems to have been originally a native of the Eastern Region. The first record we have of this species is that of Drury,[1] who described it from specimens collected in the vicinity of New York about the year 1770.

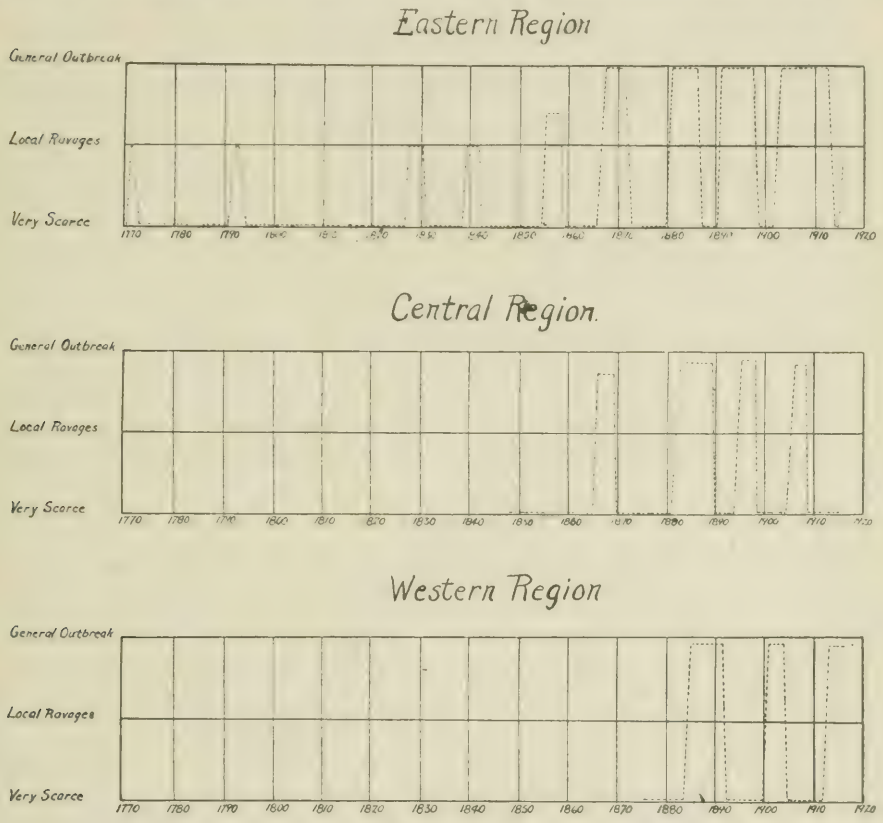
Twenty-seven years later, we find it described by Sir J. E. Smith, in his 'Lepidopterous Insects of Georgia,' as a native of Virginia and a very destructive pest.

In 1828, it was again described by Harris in the *New England Farmer,* Aug. 22nd, pp. 33-34, and six years later, he included it in his 'Catalogue of the Insects of Massachusetts,' No. 591.

[1]Drury. Ill. Nat. Hist., 1, p. 36, pl. 18 fig. 4, 1770.
Drury. Illustrations of Exotic Entomology, 1773.

Harris, again described the insect in his 'Treatise on Insects,' published in 1841, and here states, that the larvæ are "common and destructive little caterpillars whose large webs sometimes extending over entire branches with their leaves may be seen on our native elms and also on apple and other fruit trees."

No further notice was taken of the insect until 1856, when Fitch[1] reported it as "quite common around New York and Brooklyn," but he continues, "I have no knowledge of its occurrence north or west of the highlands." In the same year, Samuel Fowler[2] reported its ravages in Massachusetts, and in the



History of the Fall Webworm in North America. The dotted lines indicate the abundance of the insect.

Country Gentleman, Oct. 14th, 1858, p. 239, Fitch stated that it was "very abundant in New York State three or four times worse than for twenty-five years at least."

This was the first serious outbreak on record, and from the foregoing account it seems that the ravages of the insect have been increasing in severity, and that its sphere of destructive operations has widened. The next outbreak was much more widespread than any previously recorded, and extended north into Canada. It was first reported by Brackett, in the *Maine Farmer*, of Aug. 30th, 1866. The following year, Bethune states (*Canada Farmer,* Sept. 1st, 1867, p. 269) that a few colonies were reported from Hastings County, Ontario, and says that it is the first record for the insect in Canada, so far as known to him. He again

[1]1856. Fitch Asa., 3rd, Rep. Ins. N.Y., pp. 64-66.
[2]1856. Fowler, Samuel, 4th Ann. Rep. Sec. Mass., Bd. Agr., pp. 438-451.

refers to it in the *Canadian Entomologist,* 1868, p. 44, as "a common insect and likely to become only too familiar to apple growers." The same year, an account of the insect was given in the *American Entomologist,* Nov., p. 59, by Walsh and Riley, and they recorded it as "so numerous at Franklin, N.Y., that almost every apple tree contains half a dozen nests." In 1870, Hartwell ('Am. Ent. and Bot.,' 5, No. 2, p. 336) reported it as 'unprecedently numerous' at Wilkinsonville, Mass., and Bethune[1] recorded its great abundance in Ontario, that year and the year following. In the *Canadian Entomologist,* Aug., 1871, Saunders refers to it as "a serious pest just now affecting the apple trees. It has found its way into Ontario from the Eastern States within a few years past and is rapidly spreading." The following year, Bethune gave a popular account of it in the same publication ('Can. Ent.,' 1872, p. 141-143) and stated that it was extremely abundant and destructive throughout Ontario and the neighboring northern and central States. Saunders[1] refers to the destruction wrought by the larvæ in 1873, but no further accounts of their ravages were published for some time, so this was probably the end of the outbreak.

Seven years later, Riley ('Am. Ent. and Bot.,' Vol. 3, pp. 22-23) published an account of the widespread destruction of black ash by this species in New York; and the following year, he notes ('Am. Nat.,' 15, pp. 747-748) the beginning of an outbreak in Washington, D.C. Claypole[2] reported its presence on walnuts in Pennsylvania in 1882, and Saunders[3] (Ontario) in 1884, said the caterpillars had been found in great abundance on all kinds of trees. In the *Canadian Entomologist,* 1886, p. 23, Jack records their abundance in Quebec during the past three or four years; and the following year Harrington says ('Ann. Rep. Ent. Soc. Ont.,' p. 29) they were "very abundant and obnoxious throughout Canada." Riley also records the larvæ as exceptionally prevalent in the Atlantic States in 1886, when they became such a nuisance in the City of Washington that thousands of dollars were spent in their eradication. He later records in 'Bull. 10, U. S. Div. of Ent.,' that they were scarce the following year, which indicates that the outbreak came to an end about 1887.

It was not long, however, until the insect was again on the increase, for in 1890 it was recorded by Bethune[4] as exceedingly abundant in all parts of Ontario; and by Harvey[5] as very injurious in Cumberland County, Maine. The following year, Bethune ('Ann. Rep. Ent. Soc. Ont.,' 1891, p. 14) said it was even more abundant than ever in Ontario, and in *Garden and Forest,* 1891, pp. 291-292, Robbins, in a popular account of the insect given under the title "A Struggle with the Webworm," refers to its extreme abundance in New York State. In 1892, it was referred to several times by Bethune and Fletcher, as one of the most serious pests of our orchard and shade trees and rapidly increasing in numbers. The following year, Harrington[6] reported it as very abundant in Ontario and the Maritime Provinces and "as one of our most noticeable pests." Fernald ('Bull. 20, Mass. Agr. Exp. Stn.,' 1893, pp. 10-12) stated that it was very abundant throughout Massachusetts. Smith[7] states that the insect was

[1]1870. Bethune, C. J. S., First Ann. Rep. Ent. Soc. Ont., p. 20.
[1]1873. Saunders, Wm., Ann. Rep. Ent. Soc. Ont., p. 13.
[2]1883. Claypole, E. W., Ann. Rep. Ent. Soc. Ont.
[3]1884. Saunders, Wm., Ann. Rep. Ent. Soc. Ont., p. 12.
[4]1890. Bethune, C. J. S., Ann. Rep. Ent. Soc. Ont., p. 7.
[5]1890. Harvey, F. L., Ann. Rep. Me. Agr. Exp. Sta.
[6]1893. Harrington, W. H., Ann. Rep. Ent. Soc. Ont., p. 27.
[7]1895. Smith, J. B., Ann. Rep. New Jersey, Exp. Stn., p. 386, 458-460.

decidedly on the increase in New Jersey in 1895, the outbreak being the worst in his experience. Howard also mentions it in the 'Year Book of the U. S. Dept. of Agr.,' 1895, pp. 361-384, and says that it did much damage in Washington, D.C., in 1895. In 1896 it was still fairly abundant in some localities for Dearness in the 'Ann. Rep. Ent. Soc. Ont.,' p. 24, says "I know of two localities where every black ash, of which there were a great many trees, was completely defoliated. Weed ('Bull. 59, N. H. Agr. Exp. Stn.,' Nov., 1898) also recorded the caterpillars as "extraordinarily abundant" in New Hampshire and as causing serious injury. An infestation occurred in Maine in 1899, and probably in New York as well, since Felt gave an account of the insect that year in the *Country Gentleman*, p. 593.

The insect does not seem to have attracted attention again until 1903, which marks the beginning of our latest outbreak. In the 'Ann. Rep. Ent. Soc. Ont.,' for that year, Fletcher records it as "noticeably on the increase of late." Two years later Lochhead[1] found it "unusually numerous" at Guelph although it was apparently still quite rare in some parts of the Province (Ontario). In 1906, Young[2] (Ottawa) says its conspicuous nests were noticed in many orchards and also in the forest. In the 'Annual Reports of the Entomological Society of Ontario' for 1908 and 1909, its great abundance was noted by Gibson and Lochhead, and in the 1910 Report, Gibson states (p. 13) "During my residence in Ottawa since 1899 I have never seen so much injury by this well known pest as was done this year. It has been abundant this year all through Eastern Canada and the United States." Gibson[3] again refers to it as being present in "unusually injurious numbers" in 1912. The next year the infestation began to decrease and in 1914 the insect practically disappeared. This last outbreak was by far the most widespread and severe of any which have been recorded.

Central Region.

The first record of the presence of the Fall Webworm in the Central Region is given by Walsh, in the *Practical Entomologist*, July, 1866, p. 101. In this, he states that this insect was reported by Marion Hobart as found on apple and other trees and more commonly on pignut-hickory in Illinois. The following year, he says (*Practical Entomologist*, March, 1877, 2, p. 72) that reports from Illinois indicate many nests on wild cherry the previous autumn. In 1868 Walsh and Riley ('Am. Ent.,' 1868, Nov., p. 59) record them as having "covered the hickory trees with webs" at Madison, Wisconsin. Three years later, in his 'Second Report of the Insects of Illinois,' p. 18, Walsh writes "The Fall webworm has heretofore not been regarded as holding more than a third rank in the catalogue of noxious insects but they seem to be on the increase this season." The same year, Riley states in his 'Third Report of the Insects of Missouri,' p. 130, that this insect was "unprecedently numerous all over the country during the summer and fall of 1870." Kridelbaugh[4] reports its ravages in Iowa during the same year.

The next available record of the insect was given by Osborn in the *Iowa State Leader*, Oct. 14th, 1882. Four years later, its ravages were reported in this region by Weed in the Prairie Farmer, July 24th, 1886, p. 409, and in 1888 MacMillan[5]

[1]1905. Lochhead, Wm., Ann. Rep. Ent. Soc. Ont., p. 137.
[2]1906. Young, C. H., Ann. Rep. Ent. Soc. Ont., p. 16.
[3]1912. Gibson, Arthur, Ann. Rep. Ent. Soc. Ont., p. 15.
[4]1871. Kridelbaugh, S. H., Ann. Rep. Iowa State Hort. Soc., pp. 153-167.
[5]1888. MacMillan, Conway, Bull. Agr. Exp. Stn., Neb., Feb. 1888, pp. 64-68 and 96-100.

records it as a common insect of Nebraska. Its great abundance in Missouri the same year, was noted by Mary E. Murtfeldt in the 'Ann. Rep. Ent. Soc. Ont.,' 1892, pp. 58-59. Garman noted its "excessive ravages in Kentucky" in 1890, but says that fifty per cent. of the larvæ were killed by a fungus disease, so this was presumably nearing the end of the outbreak.

There was probably another outbreak between 1895 and 1898, but the following references, seeming to indicate this outbreak, were not available to the writer. H. E. Weed gave an account of the Fall Webworm in the *Southern Cultivator,* Sept., 1895. Webster published some notes on several species of injurious insects including the Fall Webworm in the *Ohio Farmer,* May 30th, 1895. In the *Kansas Farmer,* June 20th, 1899, pp. 438-439, the Fall Webworm among other insects, was treated by E. A. Popenoe. The same account was also given in the "Transactions of the Horticultural Society of Kansas," 1898.

In 1906 the insect was reported as very abundant in Ohio by Berger,[1] and two years later Smith of the Nebraska Division of Entomology (Circ. No. 5) records its depredations on shade trees of towns and cities all over the State. Its ravages were reported in the same year from Minnesota by Washburn ('Minn. Agr. Exp. Stn. Bull.,' 112, pp. 180-183). This is the latest outbreak recorded from the Central Region, and although it seems to have been very severe but little information concerning it is available.

Western Region.

Our information concerning this insect in the Western Region is very meagre. The first record of its presence is given by Bethune in the 'Ann. Rep. of the Ent. Soc. Ont.,' 1887, p. 58. Here he states that "last autumn (1886) Professor Saunders observed it defoliating trees in British Columbia." The next reference found is in the 'Fourth Ann. Rep. of the Hort. Soc. of B.C.,' where it is referred to as "very destructive" around Chilliwack in 1893. It is also referred to in the 'Fifth Report' of the above society, and the following year Piper stated ('Bull. 17, Wash. Agr. Exp. Stn.') that it was common all over the State of Washington.

In the 'Report of the Experimental Farms,' 1903, Fletcher states that "The webs of this Arctiid were very conspicuous in British Columbia" that season, which would indicate another outbreak of the insect at about that time.

The next reference to it is by Brittain in 1912 ('Proc. B. C. Ent. Soc.,' p. 15) when he noted the "abundance of the webs on apple and wild shrubs" in British Columbia. This was no doubt the beginning of the present outbreak which attracted so much attention last year.

Mr. Winn: Is any record being kept of any particular locality, such as Fredericton, without going so many miles away for a record? Are you attempting to keep any record of your own individual locality of either of these insects.

Mr. Baird: Yes, we have a fairly complete record of the different localities in New Brunswick.

Mr. Winn: About five years ago I wanted to get the eggs of the Forest Tent Caterpillar to send to a friend in Yorkshire, England, and I could not get the eggs for love nor money. Prof. Swaine, however, very kindly procured some eggs for me; these were from Nova Scotia and were extraordinarily abundant. It shows that in certain localities there is a great abundance while there are none

[1]1906. Berger, E. W. Bull. U.S. Bur. of Ent., No. 60, pp. 41-51.

in other parts. During this past year you may say both the American and the Forest Tent Caterpillars have become extinct on Montreal Island, while at St. Hilaire, Que., only 22 miles east, on the 24th of May this year there were thousands of caterpillars in a space as large as this room; I should think without exaggeration there were 500 *americana* webs there. A fungus disease killed off both insects apparently and not only killed off the Tent Caterpillar, but a very large number of other caterpillars as well. We don't know when they are coming back, and if any record could be kept of the number of years between certain outbreaks we might know when the next infestation or migration or whatever it may have been is likely to occur so that we could prepare for them. Fruitgrowers would no doubt like to know ahead of time so that they could head them off.

Dr. Hewitt: In reference to your enquiry as to whether any definite record is being kept, this is work of which Mr. Tothill has charge primarily. He has charge of the investigations on the natural control measures of three of our most common deciduous pests, viz.: Forest Tent Caterpillar, Fall Webworm and Spruce Budworm. Our idea in carrying on these investigations—which have already covered a period of four years—is to study all those factors which go to control these pests. For that purpose we have established in the Province of New Brunswick nine different points at which observations have been made every year at least for the last three years and in some cases for four years, so that we have exact records of what has taken place in regard to abundance, parasites and other means of natural control. In addition to that we are now undertaking investigations to cover the whole of Canada so far as we can. Next year Mr. Tothill will probably be in the West making observations on the occurrence and, so far as he can, the natural means of control of some of these insects, particularly the Fall Webworm and the Western Forest Tent Caterpillar in the Prairie Provinces and in British Columbia, our idea being to secure as thorough a knowledge as we can of the factors which go to control these insects under natural conditions. We have been rather prone to attribute everything to insect parasites; that has been in some cases an assumption not based on sufficient evidence and already very interesting results have come out, but of course, as I have said, we are undertaking to carry on these investigations for a number of years.

I have not had time to discuss this paper with Mr. Baird yet but there is one point which seems to me of interest and importance. You will notice from his charts that there is a certain amount of regularity in regard to the outbreaks in what I would call the historical period which goes back to about the middle of last century but if we call the period before that the pre-historic period so far as exact observations by entomologists are concerned I think we can explain the nature of the evidence of that period. I feel rather inclined to attribute the apparent local restriction of the ravages as Mr. Baird has termed them in his charts of the Fall Webworm and the Forest Tent Caterpillar not so much to the fact that they were actually local but to the fact that the observations did not extend over a large area. Consequently the records of abundance were confined to certain localities.

Prof. Lochhead: These charts are very interesting to me and I think the study is very timely. The charts reveal a great deal, it seems to me. There is one thing that stands out and which impresses me very much, a point which applies to the Forest Tent Caterpillar as well as the Fall Webworm. It

seems that the chief factor in the limitation of these pests is that the parasites are apparently everywhere at the same time and that the outbreaks occur in the same years almost throughout the three different regions. It looked that way to me when looking at those charts just now.

DR. HEWITT: I do not think they quite coincide, *e.g.*, the 1870 and 1880 outbreaks.

PROF. LOCHHEAD: Outbreaks are coincident, and the parasites must have developed in the different regions at the same time and in greatly increasing numbers. That would seem to eliminate any method of control—for example, the distribution of parasites that would tend to prevent the outbreaks. In the Northern Forest Districts between those of the Central or Western at different times it might be possible, if we had better resources at our hand, to carry parasites from one district to the other.

DR. BETHUNE: I might mention one instance of very exceptional natural control in connection with the American Tent Caterpillar. It was about 25 years ago when at Port Hope we had a steadily increasing abundance of these insects from year to year; they were extremely numerous. In this particular spring the caterpillars had emerged from their cocoons when the apple buds were just opening and we had a very severe frost that killed them all; we saw no more of those tent caterpillars for three or four years. Of course that would be a very exceptional case.

MR. HARRINGTON: In reference to the tent caterpillar I may say that the first time I was in British Columbia, that is about 1888, there was a serious infestation then in the district around Victoria. Parasites were lessening the ravages. That would correspond apparently with the first outbreak that is on that chart of the Western Region in 1888. The infestation was very heavy. With regard to more recent infestations which we have had in this eastern section of the country, of course three or four years ago the ravages were very serious in certain districts of Quebec Province. Some species of trees, poplars, etc., were almost totally defoliated for two or three years and the caterpillars were so numerous as to stop the trains. I know this is a fact, because I was on a train which was stopped by caterpillars on the track. That infestation has been checked now, and I think principally by the tachina flies as the infestation reached its maximum. There is no doubt, I think, that the caterpillars were almost entirely wiped out by these tachinids although last year there were, of course, webs to be seen in the same district. They build almost entirely on the wild cherries which are the natural habitat of the caterpillar under ordinary conditions. They seldom spread to other trees until the infestation increases towards the maximum, and that appears to be about every ten years, as far as my recollection goes, of the occurrences which I have seen in thirty or forty years. Sometimes, of course, caterpillars are subject to a fungus disease but the reduction of the numbers I think is chiefly due to our good friends, the tachinids.

PROF. CAESAR: I wonder if Mr. Harrington has reared those tachinids.

MR. HARRINGTON: I did a good many years ago.

PROF. CAESAR: The reason I ask is because I collected quite a number of Forest Tent Caterpillar cocoons and reared the parasites from them, and they were all *Sarcophaga aldrichia*, a new species described two years ago. I do not mean that those Mr. Harrington saw were not tachinids, but all I reared were sarcophagids.

MR. GIBSON: We collected a large number of the cocoons and I remember distinctly sending a lot to Mr. Tothill who failed to report on them.

Mr. Baird: I do not think anything was ever reared from those: they were in poor condition when they arrived as they were a long time in reaching the laboratory.

Prof. Caesar: I merely mention this matter because it is possible we are not doing justice to the sarcophagid flies.

Dr. Hewitt: I think Mr. Tothill has raised both tachinids and sarcophagids.

FRIDAY AFTERNOON.

Mr. Winn: The programme is a very lengthy one and this year I think it would again be advisable to dispense with the Presidential address. As practically all matters connected with our season's work have been covered by our various reports the address would be either largely repetition or else be merely a paper and I have already read one. Before the programme was completed and found to require all the available time, I thought of two subjects that might be of interest. One was to show a series of slides that I had begun preparing with Mr. H. M. Simms of our Montreal Branch, calling attention to the very curious microscopic objects known in Europe as "battledore" scales or "bladder-scales" of the Blue butterflies. These are found on the wings of the males only and are much smaller than the regular wing scales and apparently each species has its own characteristic size, shape and pattern of "battledore." We have not succeeded in obtaining specimens of quite all the North American so-called species, but with the kind assistance promised it is hoped that by the time Mr. Simms returns from "somewhere in France" we may have an almost complete series to show.

The other idea that occurred to me was in connection with the Society having spread from a centre which was originally Toronto, then London, now Guelph, always in Ontario, to a national Society extending from the Atlantic to the Pacific. We have branches in Nova Scotia (represented by Prof. Brittain) the Montreal Branch, Toronto Branch and the parent Society in Guelph, individual members scattered through all the Provinces and a very flourishing Branch in British Columbia. I thought the annual address might take the form of a composite article by all the different branches regarding the insect collections of the Dominion of Canada. I have spoken to Dr. Walker and he thinks this can be arranged by a series of articles published in the *Canadian Entomologist* as part of the popular series now being printed. It would be impossible to read such a report at a meeting like this; I leave it for your consideration, and if found feasible, your co-operation.

CAMP HYGIENE.

Capt. G. J. Spencer, O.A.C., Guelph.

The main object of military hygiene is to keep men healthy, or else they cannot march. In camp certain factors control this, such as food, work, exercise and the condition of the body. As far as food is concerned, a Canadian soldier is fed more generously than one of any other nationality, as he is allowed five pounds of food a day. Beef constitutes the invariable meat ration, because it can be more easily obtained, is cheaper, and is more preferable to the men; potatoes, peas, beans,

carrots and cabbages, are the standard vegetables; coffee and tea are supplied at breakfast and supper. Meals are drawn up a week ahead on a diet sheet, and it lies with the Quartermaster of each battalion to vary this, and to make the meals as appetizing as possible. The men are generally allowed to have as much as they can eat. Extras of food such as pie, cookies and fruit in season, are supplied when canteen funds permit.

I need not say anything about work. Exercise is supplied by a carefully arranged syllabus of physical training and bayonet-fighting, on a system calculated to stretch all the muscles of the body, and to produce speed and quickness, rather than over-developed, hard muscles. No apparatus is employed. The bayonet-fighting is a combination of the British and French systems, and was made up to meet the exigencies of trench warfare. Men are taught to kill their opponent, or to put him out of action in any way possible without any "gentlemanliness" or rules of fair fighting. Boxing, which is much akin to bayonet work, and games of skill, are always taught and encouraged.

To insure immunity against typhoid and smallpox, every officer and man is inoculated and vaccinated.

Life in a training camp, as far as it concerned Camp Borden, was intended to fit for the front, as far as could be done in this country, men who were already hardened to military life, and had already received their preliminary training. The general health of the camp was excellent. The problem of sanitation was reduced to a minimum on account of an extensive and excellent system of plumbing, which provided almost hotel conveniences. Strict rules were made against throwing rubbish around or committing a nuisance anywhere in the camp area, and because the wash houses were at one end of every battalion area, tubs were placed in each company line for the convenience of the men at night. These were removed the first thing in the morning. The men slept in bell tents, 8 to 10 men in a tent, and the notorious Camp Borden sand was soft to lie on, until wooden tent floors were brought from Niagara Camp for some of the battalions.

What with the open air life, the work and exercise, the freedom from city evils and an abundant supply of the purest water for drinking and shower baths, the health of the men was excellent, and their physical condition greatly improved through the summer.

As far as Entomology is concerned, I know of only three cases of lice in our battalion all the summer, one of head and two of body lice. The treatment was one of prevention, but where a case of infestation occurred, the subject was at once taken to medical headquarters and given a prolonged hot bath, while his clothes, blankets and kit, and that of all the other men in his tent, were passed through carbolized steam under pressure for half an hour, and were ready for him after the bath. This treatment worked admirably, and no second application was necessary. The carbolized steam installation was used to sterilize the blankets of the camp, and could treat those of a battalion, *i.e.*, about 4,000, in a day. This was done once a month, for each battalion. A system of the same kind is being installed at the headquarters of each military district and it is proposed to periodically treat the blankets of the battalions in winter quarters.

House flies were a nuisance and increased rapidly throughout the summer. The five cook-houses of each battalion were wire screened and provided with spring wire doors, but flies were troublesome in the men's tents. With regard to our brigade, I could not account for the pest of flies, because the most stringent rules were enforced about garbage and refuse of all kinds. Special bins were provided for all waste matter and horse manure, and were emptied daily by a Government con-

tractor, who carted it away. Fatigue parties picked up all rubbish twice daily, and later in the summer, sheet iron incinerators were provided, that burnt all garbage, waste paper, horse manure and camp sweepings. And still the flies increased! If all the brigade areas were as well kept as was our own, I am at a loss to explain the pest of house flies, as I could not discover any breeding places. In the Quartermaster's stores, the Canteen, the Hospital and some of the office tents, the men used Jeyes' fluid, which was issued from the stores, in the proportion of one half to one pint per pail of water, for spraying around on tent walls and furniture. This was fairly effective as a preventive, and I showed some of the orderlies how to make nets from wire and cheese cloth, which they used all the rest of the summer, taking keen interest in fly hunts for competition.

One other point of Entomological interest occurred this summer. A private in my company, formerly a High School student and a boy of clean habits, was admitted to the Base Hospital in Toronto for an abdominal operation. When he got to Toronto he suffered with slight earache, and two days after admittance this increased to intense pain, and he found newly hatched maggots crawling in his ear. He promptly reported it to the doctor, who ordered irrigations of boracic acid, followed by alcohol and bichloride, 1 to 8,000. After three days of this treatment, all trouble ceased. To my disappointment, I found that neither patient nor doctor had preserved any of the maggots, and they were not identified.

In conclusion, hygiene on the march is much as I have outlined it for camp. Meals cook in travelling field-kitchens as the wagons follow the column. The water supply is inspected by the Medical Officer, who rides on ahead with a Field Officer, to select a site for the camp. As soon as a force halts, temporary latrines are dug as far away from the kitchens as possible, and after use are covered in and marked with the letter "L" in stones or sods, as a warning for troops following on behind.

THE EXPERIMENTAL RESULTS IN APPLE MAGGOT CONTROL.

Prof. W. H. Brittain, Truro, N. S.

The work of our department with the apple maggot began in 1913, when an inspector, sent to investigate a report of this pest near Digby, uncovered a severe infestation in that locality. One of the worst infested orchards was selected for experimental purposes the next season.

The work for the next two seasons was conducted by my assistant, Mr. C. A. Good, who has given a full account of his work in the Report of the N. S. Entomological Society for 1915.

In the first year of our work, the mistake was made of spraying only a portion of the orchard, leaving the rest as a check on our work. There was, it is true, a decided advantage of the sprayed over the unsprayed portion, the former showing an infestation of 12 per cent. in the fruit of all varieties, and the latter of 44.7 per cent. We also sprayed isolated trees in infested orchards, getting no reduction in injury, one such tree showing an infestation of 99 per cent. From this it was evident to us that it was useless to spray only a portion of the orchard, on account of re-infestation of sprayed trees from neighboring unsprayed ones.

In the meantime our inspectors had uncovered another severe outbreak of this pest in the neighborhood of Windsor. Both the Digby and Windsor districts, one situated on the west, the other on the east of the main fruit belt, afford

exceptional facilities for spraying work with this pest. The orchards are small and isolated, and a number of them suffer from very severe outbreaks of the maggot. This gave us an opportunity of thoroughly testing the use of the sweetened poison in this locality, since it was an easy matter for us to secure suitable orchards for spraying, and take neighboring ones for use as check orchards. Five orchards were accordingly selected in each district, three being treated twice with arsenate of lead and molasses, and two left as checks. In checking up the results of our work we counted, as nearly as possible, all the fruit from the experimental trees, a total of 260,000 in 1915.

The results of this work having already been published, it is unnecessary for me to refer to them in detail, except to say that they were a striking success, though the season was a very wet one. Orchards in which the fruit of susceptible varieties had been a total loss for a number of years past, gave us fruit that was 95 per cent. free from infection.

A number of experiments were conducted during the season with flies confined in cages over apple seedlings, which were sprayed with various poisons, both with and without molasses. The results showed the interesting fact that, under these conditions molasses was of no particular benefit. Though these conditions were not by any means normal for the flies, this experiment suggested the possibility that the molasses might be eliminated without lowering the efficiency of the spray.

Next season additional orchards were chosen, making altogether three sprayed and two check orchards at Windsor, and six sprayed and two unsprayed at Digby. Three arsenicals, viz: lead arsenate, calcium arsenate and barium arsenate, were used, both with and without molasses. Briefly summarized the results were, that all these sprays effectively controlled the maggot, and that there was no noticeable advantage in those containing the molasses.

This fact that we have thus demonstrated experimentally is substantiated by much indirect evidence. The most significant fact brought out by our inspection is that both the badly infested districts are outside the main fruit belt, where spraying has never been practised. As soon as we get into the well sprayed parts of Kings and Annapolis, the pest begins to disappear. In spite of this, we have been able to find the pest in the haws at various points throughout the Annapolis Valley. In one such locality I have been informed that years ago there were severe infestations of this pest in the orchards of the district, but that with the advent of arsenical sprays it gradually disappeared. A very careful search also revealed the presence of the insect in apples at widely separated points. Inquiry here also elicited the information that formerly the pest was much worse in such localities, but finally died out as spraying became general.

There can thus be little doubt from the evidence on hand, that sprays of arsenicals alone will control the apple maggot, and that the arsenical residues from the sprays ordinarily applied in the orchard are usually sufficient to keep it in check.

PROF. CAESAR: I have listened with a great deal of interest and pleasure to Prof. Brittain's paper, especially as his results corroborate so fully those secured by Mr. Ross and myself during the last four years. Our first tests with sweetened arsenate of lead as a means of control for the insect were on undivided trees or groups of trees in an orchard instead of on the whole orchard, because at that time we believed, along with most other entomologists, that this insect did not fly much from one tree to another, but remained close to the same tree through its life. Our results showed that if this were true, spraying with sweetened arsenate of lead was quite

unsatisfactory as a control measure. Fortunately that same year I was studying the very closely related two species of Cherry Fruit-flies, and found in the course of my work proof that these moved around freely from tree to tree, though we should not have suspected it to watch them. This discovery along with the excellent results obtained against the Cherry Fruit-flies by the use of arsenate of lead and molasses, led us to hope that by spraying a whole orchard at a time, or at least very large blocks of trees, the same good results from the poison on the Apple Maggot might be obtained as had been so easily obtained against the Cherry Fruit-flies. Acting on this hope we conducted a series of spraying experiments with sweetened arsenate of lead in 1914, 1915 and 1916, and as a result of these experiments both of us were thoroughly convinced that arsenate of lead and molasses was a simple and satisfactory means of control. We did not try, except in cage experiments, arsenate of lead, or any other poison alone, simply because we found it difficult to discover a sufficient number of orchards in which to make satisfactory and separate tests of more than the one remedy. We plan next year to make such tests, and also some others that we have been working on this year in a small way in cages, and that seem to promise well.

As to the length of time it takes arsenate of lead to kill the adult, I cannot recall the results Messrs. Ross and Good obtained, but this year I conducted a series of cage experiments begun shortly after the flies began to emerge, and continued until they disappeared from the orchard. These showed that flies caught in the orchard without injuring them and put into cages with poisoned and unpoisoned leaves and fruit in the same cage and watered daily, died on an average in less than three days, whereas the check flies lived a much longer time. Moreover, there is good reason to believe that even though an orchard is not sprayed until a number of flies are ready to lay eggs, the poison acts in such a way as to stop egg laying almost at once after it is eaten by the fly, even though she herself may live a few days longer before death ensues.

As to the sweetened poison attracting flies from some distance, I have never been able to see the least proof that this was true either of the Cherry Fruit-flies or of the Apple Maggot. They merely eat it if it happens to be on the leaf or fruit where they are feeding; they do not go in search of it.

EXPERIMENTS ON THE CONTROL OF LOCUSTS WITH COCCOBACILLUS ACRIDIORUM D'HERELLE.

E. Melville DuPorte and J. Vanderleck, Macdonald College, Que.

Since 1910, when d'Herelle isolated from diseased locusts in Mexico a bacterial organism causing an epidemic disease in these insects, efforts have been made in various parts of the world to utilize this organism in the destruction of locusts. D'Herelle himself in the year following his investigations in Mexico, conducted experiments in the Province of Santa Fé in Argentina, and reported remarkable success.

Sergent and l'Heritier, working in Algeria in 1913, did not have an unqualified success in their attempts to disseminate this disease, for while they were able to collect dead locusts by hundreds in the areas which they had infected, they found that the size of the swarms was not appreciably diminished. They attributed their failure to three contingencies. Either the infection did not spread through the majority of the migrating swarms, or many of the locusts possessed a natural immunity, or else they easily acquired an active immunity against the organism.

As a result of his work in South Africa Lounsbury, in 1913, came to the conclusion that in this country the method of d'Herelle can be used only as a supplementary measure, and that only under certain conditions. It cannot be used as a substitute for arsenical poisoning.

Further work in Algeria, in Tunisia and in Morocco, has demonstrated that this method can bring about a considerable reduction in the size of the swarms of the migratory locusts which invade these countries. In each case it was found possible to create an epizootic centre by placing a few diseased locusts among the healthy ones.

In the summer of this year (1916) at the request of Dr. Hewitt, the Dominion Entomologist, we conducted experiments at Macdonald College, to determine whether d'Herelle's infection method could be effectively used in combating the locusts of Eastern Canada.

Increasing the Virulence of the Organism. D'Herelle found that when kept for some time in artificial culture the organism gradually loses its virulence, but that the virulence could be progressively increased by passing the organism successively through a series of locusts. The culture sent us by Dr. Hewitt was obtained by him from d'Herelle, and was consequently quite old when our work was commenced. In order to obtain an active culture, and to have this on hand for daily use, we inoculated several locusts each day with a suspension of the intestinal contents of one of the locusts dead from the previous day's inoculation.

The first lot of nymphs was inoculated directly with d'Herelle's pure culture. At the end of twenty-four hours thirty-three per cent. were dead, and at the end of forty-eight hours fifty per cent. In five days all of the inoculated locusts had succumbed to the disease. Plates poured from the intestines of the dead locusts gave a pure culture of *Coccobacillus acridiorum*. One of the locusts which had died during the first twenty-four hours was carefully opened with sterilized instruments and a suspension of a portion of its intestinal contents made in sterilized water. This suspension was used to inoculate the second lot of locusts. This second lot died slowly, only 83 per cent. having perished at the end of five days. The third and fourth lots showed an increase in the virulence of the organism, but in each case there were three insects surviving after twenty-three days. Of the sixth lot sixty per cent. were dead at the end of twenty-one hours and the remaining forty per cent. at the end of thirty-four hours. Sixty-four per cent. of the seventh lot died in twenty-two hours, and the remainder were all dead within thirty hours from the time of inoculation. After this the virulence of the organism progressively increased; no locusts survived, the deaths occurring in four to twelve hours. Thus our experience in increasing the virulence of the organism coincides with that of other workers.

Insects Affected by the Disease. The pathogenicity of the organism was tested for all species of locusts and grasshoppers commonly occurring in this region. These were *Melanoplus femur-rubrum*, *M. bivittatus*, *M. atlanis*, *Dissosteira carolina*, *Camnula pellucida*, *Stenobothrus curtipennis* and *Xiphidium* sp. The coccobacillus proved to be pathogenic to all these species. It gave us considerable satisfaction to observe that the animal parasites were apparently not affected by the disease. Innumerable individuals of *Gordius* emerged alive from inoculated locusts, and we were able also to rear several adult *Sarcophagids* from these diseased insects.

An Indigenous Organism. On August 16th, before any experiments were started outdoors, a dying *bivittatus* was found about a quarter of a mile away

from the laboratory. The intestines were decayed into a black mass resembling that of insects killed by *C. acridiorum*, but not quite so slimy. Agar plates were made from the contents of the intestines and a practically pure culture of a bacillus closely resembling that under study was obtained. Twenty locusts were inoculated with this organism, and all but one died within forty-eight hours. From these dead locusts a series of successive inoculations was made to determine whether the organism would increase in virulence similarly to *C. acridiorum*. We found that this was the case; the later ones in the series dying very much sooner than the earlier ones.

A very large number of other locusts, healthy, sickly or dead were collected on Montreal Island, and other islands in the Ottawa as well as on the mainland along the north shore of the Ottawa. In almost every case this organism was found in the intestines. We are at present making a study of it to determine whether it belongs to the same group as *Coccobacillus acridiorum*.

Experiments in the Laboratory.

In order to become acquainted with the nature of the disease before working with it in the field, we conducted numerous experiments in the laboratory, the results of which are here briefly summarized.

Several locusts were sprayed with a suspension of the coccobacillus, and put into a sterilized cage. At the end of eight days fifty per cent. of these were dead. The others remained alive for several days after when their death could not with certainty be attributed to the organism, because several of the dead locusts were parasitized, and it was often difficult to tell whether death was due to the disease or to animal parasites: it must therefore be borne in mind that an appreciable proportion of the deaths recorded in this and other experiments was probably due to parasites.

Experiments were tried to determine whether the disease would spread rapidly from dead or diseased locusts to healthy ones. To this end a number of healthy insects were placed in cages with dead ones. The species used was largely *M. femur-rubrum* with a few individuals of other species. A very low mortality was obtained. It was observed, however, that occasionally a *birittatus* would feed on the dead insects, and in order to determine the effect of this habit on the spread of infection *M. birittatus* and *M. femur-rubrum* were placed in equal numbers in a cage with fragments of dead locusts. At the end of eight days eighty per cent. of *birittatus* were dead, and only twenty per cent. *femur-rubrum*. In this connection it may be stated that in the cases in which investigators have obtained successful results in the artificial dissemination of *Coccobacillus acridiorum* the locusts experimented upon showed marked cannibalistic tendencies, the healthy ones devouring the sick and dead.

Placing healthy locusts in unsterilized cages in which diseased locusts had been confined and had died but a few hours previously caused no disease or death.

A number of locusts were fed with a bran mash to which a suspension of *C. acridiorum* had been added. At the end of seven days fifty per cent. were dead, four days later the mortality had reached seventy-five per cent. The remainder were removed to a clean cage, and eight days after their removal were all dead. It is thus evident that ingestion of the organism will produce disease and death.

Field Experiments.

An attempt was made to establish an epizootic centre in a field of clover badly infested with *M. femur-rubrum*, and to a lesser extent with most of the other species used in the laboratory. A small area of this field was treated with bran mash, to which a culture of the organism had been added. The field was examined carefully for several days, but no evidence of the establishment of an epidemic among the locusts could be obtained. A large number of locusts was collected from the infected area and placed in cages in the laboratory, but the disease failed to develop among them. The experiment was repeated on a badly infested lawn with a similar result.

In order to check results more definitely outdoors, a small area of a lawn was enclosed with a wire screen, and a large number of locusts included. First of all the enclosed area was sprayed with a bouillon culture of the coccobacillus. At the end of a week there were no deaths. The failure of this experiment may have been partially due to the death of the organism, as a result of its exposure to bright sunlight.

The wire cage was next moved to a new locality and bran mash sprinkled on the grass. From this a high mortality was obtained.

Twenty locusts inoculated with a virulent culture of the organism were next introduced among the healthy locusts in a new enclosed area. The cage was examined every day, and at the end of the fifth day there were only thirty-nine dead, including the twenty inoculated individuals. The experiment was continued for several days, but no further deaths were observed.

Conclusion.

The foregoing investigations point to the conclusion that the infection method of d'Herelle for the control of locusts is not practicable in Eastern Canada, because of the probable immunising effect of a native bacillus, and also because the principal means of the natural dissemination of the organism seems to be the eating of the dead or diseased locusts by the healthy ones, a cannibalistic tendency which exists only in a very slight degree in our native species.

There may, however, be conditions under which this method may prove effective, so that we hesitate to say definitely after only one year's work, that it can have no place in control methods in Eastern Canada.

Dr. Hewitt: Perhaps if I were to explain the genesis of this work it might facilitate discussion afterwards. I have been in correspondence with Dr. d'Herelle for some years, and in 1913 obtained specimens of his culture from him, and had one of our officers, Mr. Petch, work with it that year, and the two following years, and we found that *C. acridiorum* was pathogenic to our native species, especially the species which are most abundant. In 1914, we carried out our first field experiments in control, but the climatic conditions were such that we did not feel justified in placing any definite conclusions. In 1915 the conditions were more favorable, and we used the bouillon exactly as d'Herelle had instructed in his letters to me, as well as in his papers, but we were unable in that year with every condition favorable to find that it could be used in Eastern Canada at least in the Province of Quebec, where these experiments were tried.

As I knew that the authors of the paper just read were studying the micro-organisms affecting insects, I took the matter up with Dr. Harrison, and suggested that they carry on these experiments with *C. acridiorum* still further, because I

realized that the combination effects of a bacteriologist and entomologist were required. As I had no bacteriologist on our staff, I thought this a favorable opportunity, and I am very pleased to find that the conclusions of one season's work confirm the conclusions that we had come to as a result of our experiments.

I think the suggestions they make in regard to the reasons for the lack of success, viz: that in the first place we may have comparative immunity among some of our species of grasshoppers owing to the presence of a specific Coccobacillus of our own, and secondly the absence of any cannibalistic habit are the most probable. To get the cannibalistic habit in the pronounced degree that you would require to obtain success in your experiments you would have to have enormous number of locusts. I think the two reasons advanced will probably prove to be the cause of the inability to use this Coccobacillus in Canada, and it certainly cannot be recommended at the present time.

SOME FEATURES OF INTEREST IN CONNECTION WITH OUR STUDIES OF FOREST AND SHADE TREE INSECTS.

J. M. Swaine, Entomological Branch, Department of Agriculture, Ottawa.

This season, as usual, British Columbia furnished many interesting forest insect problems, though but two are mentioned here. The work with the Western Cedar Borer, a species of *Trachykele*, has afforded us valuable information upon the life history and habits of the beetle, and especially upon the districts at present affected, and the types of trees most subject to attack. There is apparently little hope of obtaining an effective control for an insect that breeds freely in the heartwood of living forest trees, but we expect to materially assist the lumbermen in avoiding loss from its work. It is interesting that while the borers do occur in apparently normal healthy cedars their work is usually found in dead top cedars upon the ridges. It is evident that burning the slash from infested trees, before the early spring, will materially reduce the numbers of beetles in the limit, and that the infested timber should be utilized, so far as practicable, for such purposes as it is still suitable.

The bark beetle outbreaks in the yellow pine and black pine of Southern British Columbia have been spreading rapidly until the present season. In some of the valleys, where three years ago the outbreak was evidenced by clumps of red-tops here and there, numbering each from five to about fifty trees, the injury is reported now as beyond any reasonable hope of control. However, an interesting condition has apparently arisen in at least the western portion of the infested area, where our reports would indicate that some influence other than parasites has succeeded in at least temporarily checking the spread of the beetle. Mr. Chrystal examined the infested valleys of the Nicola region, and is satisfied that there has been little extension of the infestation this summer. The cause of this check is not yet apparent, but it is worth noting in this connection that the summer and winter of 1915 afforded most unusual weather conditions in the area concerned. The summer of 1915 had an extremely heavy rainfall over this normally dry country, and the following winter will be long remembered throughout Southern British Columbia for its extreme cold. In the spring of 1916, wide definite belts of timber well up on the mountain sides were turning yellow and were apparently killed, in the Nicola country, as well as at other places, such as Field, B.C. The explanation appears

to be that the unusually wet weather had resulted in excessive tree growth for the season with much unripened wood at the time winter set in. This could be expected to obtain to a fairly definite altitude well up the mountain sides. The excessive cold acting upon this unripened wood could be expected to cause considerable injury as far down the mountain sides as a sufficiently low temperature obtained. Much of this timber that appeared seriously injured or killed has in large part recovered. It is possible that a combination of weather conditions that has so seriously affected the timber, may have been affective in checking the development of the Dendroctonus beetles. Next summer's work in this region should afford much interesting information.

The Willow Leaf Beetle (*Galerucella decora*) on the Prairies.

The Canadian Prairie Provinces were visited this summer by most extraordinary flights of the Willow Leaf Beetle, *Galerucella decora*. The beetles were very numerous and injurious from Alberta to Southern Manitoba, and in many localities they appeared in immense flights, defoliating the shade trees with extraordinary rapidity, and attacking a variety of foliage. Under normal conditions this species breeds chiefly upon the willows, but feeds also upon poplars, and can be effectively controlled by poison sprays. When the great flights occur, however, unusual control measures must be employed, and without loss of a moment's time. If the facilities for the spraying are ready for immediate use, applications of strong kerosene emulsion to the beetles swarming upon the trees will prevent serious defoliation, and some of our correspondents were able to save their most valuable trees by smudges made of horse manure and litter, and kept burning until the flight of the beetles was over.

Pine and Spruce Borers.

Throughout the history of lumbering in Eastern Canada, there has been, each season, more or less serious loss from boring grubs in pine and spruce logs left in the woods unprotected over one or two summers. Special studies of these injuries and of the most practical methods of averting them under varying conditions, recently undertaken, have supported the recommendations that we have been making to our correspondents. Without going into the details of the experiments the results may be briefly given. The injury to white and red pine logs in our forests is caused by grubs of *Monohammus notatus* and *M. scutellatus*, the injury to spruce logs largely by *M. scutellatus*. *M. marmorator* has been bred by me only from balsam fir, and this species is in any case too rare in most localities to be of economic importance.

Floating the Logs. Logs of pine and spruce which must be left in the limits over a season should, if possible, be placed in water as soon as the ice is gone. If the logs are placed in a loose boom so that there is considerable drift, and therefore the top side of the logs is frequently wet there is rarely any serious injury, but an additional safeguard is employed in turning the logs about one month after they have been floated. I have not known logs handled in this way to be seriously injured by borers. If, as rarely occurs, the logs must be made into a close boom, so that there is little or no wave play over the top side of the logs, the turning should not be omitted, and particular attention should be paid to any so-called "yellow pine" sticks, since these float particularly high out of the water.

Barking the Logs. If the cut, or any part of it, must be left over summer in the woods, such logs can be completely protected by barking them before the middle of July. The beetles will not lay their eggs upon bare wood, and the young grubs feed for nearly a month on the inner bark and sap-wood before boring in below the wood surface.

Covering Logs With Brush. If barking the logs is considered too expensive, or must be discarded for lack of labor, we believe that the logs can be quite as completely protected by covering them densely with brush before the men leave the woods, or at least before June 1st. The logs should, of course, be piled on skidways, and should receive a very thick and complete covering of green spruce, pine or balsam boughs. The spruce brush makes the densest shade, and should, therefore, be used when it is easily available. The beetles love the sunlight, and will not enter the dense shade to deposit their eggs in the bark.

Other methods employed in our tests, and recommended by certain lumbermen, gave a varying amount of protection, but none of them for either cheapness of operation or effectiveness in protection could be compared favorably with covering with brush. For instance, crib-piling the logs in the open does not in our experience protect effectively the under side of large pine logs, since the under side is only moderately shaded and not effectively dried; spruce logs are, apparently, fairly well protected by crib-piling, probably because the bark is thinner and dries more rapidly.

The Imported Alder Leaf-miner, *Kaliosyphinga dohrnii.*

This interesting species has been recorded in American literature several times, apparently under different names. Professor Slingerland's specimens, bred from European alder at Ithaca, N. Y., were determined by Konow as *dohrnii*. Dr. Fletcher referred to the species found in European alder at Ottawa as *Fenusa melanopoda*. Mr. Harrington refers to the same species under *Fenusa varipes* St. Farq. (melanopoda Can.), and Dyer describes the larva of the "Imported Alder Leaf-miner" under *Fenusa varipes* St. F.

The imported alders in the Arboretum at the Experimental Farm, Ottawa, have been attacked by the leaf-miner for many years. Dr. Fletcher stated in 1891 that it had been injurious for the three preceding years to the imported alders in the Arboretum; and in 1893 Mr. Harrington recorded it from native alders in that neighborhood. For the last four summers several species of these imported alders have been very heavily infested so that their beauty has been very largely destroyed. This season spraying was commenced, and the numbers of the insects greatly reduced. A species, probably the same, has been abundant for several seasons in native alders in a swamp about three-quarters of a mile from the Arboretum, so that, as Mr. Harrington has stated, the species is apparently well established.

The Injury. The larvæ excavate mines beneath the upper surface of the leaves, causing unsightly brownish blisters. The blisters increase in size as the larvæ feed, turn brown, merge into each other, and may entirely cover the upper surface so that the upper epidermis is completely separated, and the leaves killed. There are sometimes more than a dozen larvæ working in one leaf.

When the attack is severe the beauty of the foliage is largely destroyed, and the destruction of so much leaf surface must have the effect of weakening the trees.

The Adult. The adult insect is a small, shining, black sawfly about three millimetres in length, with brownish tibiæ and tarsi and dusky wings; the radial

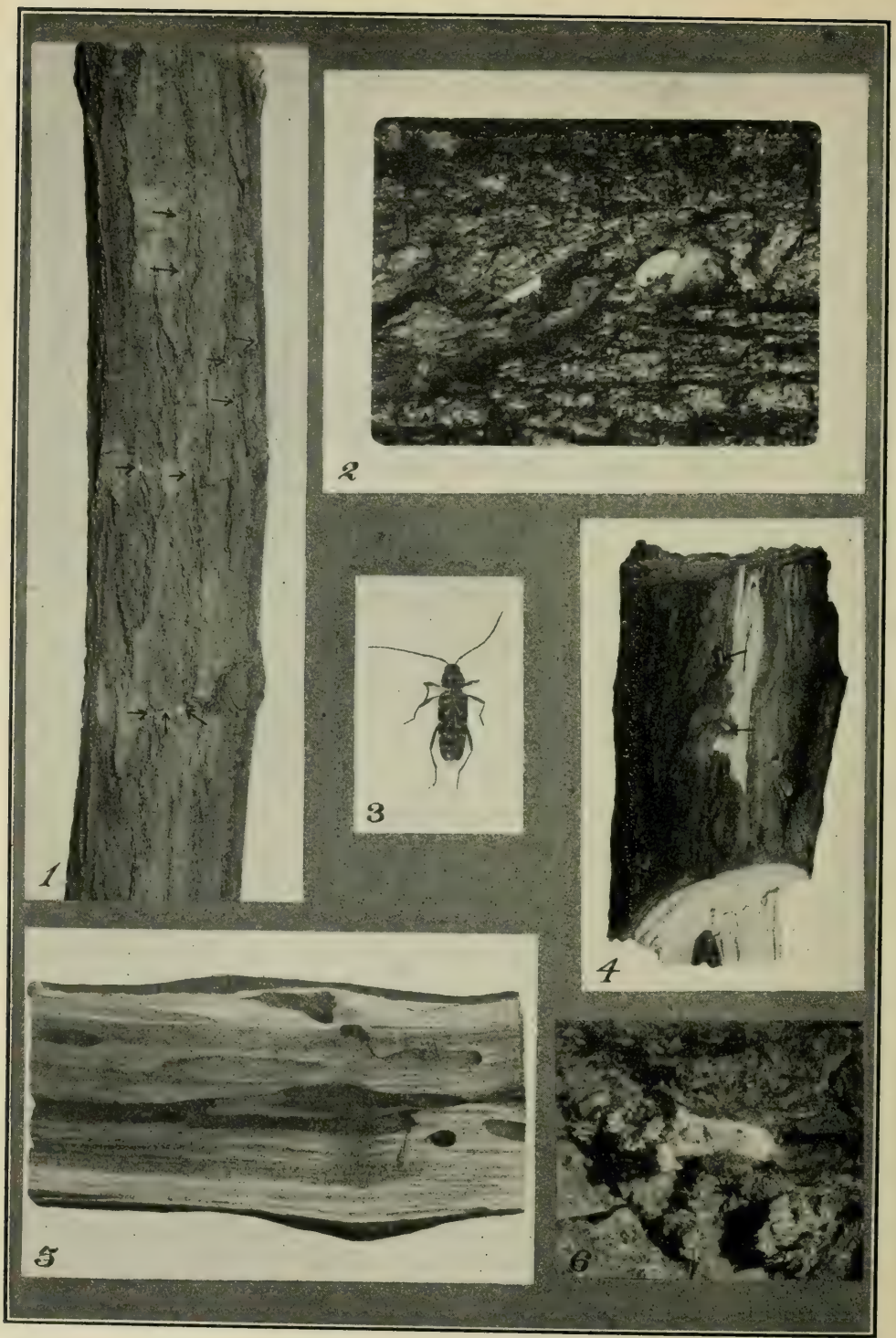


PLATE 1.—The Locust Borer, *Cyllene robiniae.*

Fig. 1.—Eggs in the bark crevices.
Fig. 2.—Eggs in situ, greatly enlarged.
Fig. 3.—The adult beetle, slightly enlarged.
Fig. 4.—The hibernating larvæ in the bark.
Fig. 5.—Larval mines in a locust trunk.
Fig. 6.—An egg, in situ, filled with boring dust.

cross-vein lies behind the second cubital cross-vein instead of immediately before it, as in the closely allied elm species, *K. ulmi* Sund.

The Egg. The small, round, whitish egg is deposited by the female fly beneath the upper epidermis of the leaf through a slit cut with the ovipositor in the upper surface; the egg is easily recognized as a small yellowish swelling in the upper leaf surface.

The Larva. The larva is six or seven millimetres in length, segmented, slender, whitish in color, or greenish from the food particles ingested, the flat head the true legs brownish, and the prolegs rudimentary.

The Life History and Habits. The eggs hatch in a few days, and the young larvæ at once begin feeding upon the pulp of the leaf; the epidermis forming the roof of the blotch mine thus produced, turns brown and makes the work of the larva conspicuous. As the mine increases in size it is frequently bounded on each side by the parellel lateral leaf veins, but when many larvæ are working in one leaf, and there may be as many as twenty in a large one, the mines coalesce and may entirely loosen the upper leaf surface, as has been done in figure 7, pl. 2. When an infested leaf is held to the light the larvæ may be seen distinctly at work within their mines, figure 1, pl. 2.

When the larvæ are full grown they break through the thin, dead, upper skin of the mine, drop to the ground, and spin a thin silken cocoon slightly below the surface; frequently grains of sand and small pebbles adhere firmly to the silk and form a framework or support for the cocoon.

The pupal period of the summer broods lasts for about two weeks. The first cocoons of the second generation were started this season in our cages on August 8th, and the first adults emerged on August 26th.

The Number of Broods. There has been some doubt apparently as to the number of broods each season. Dr. Fletcher has recorded two broods for Ottawa in 1891, and Professor Slingerland estimated for Ithaca "at least two or three broods, perhaps more." Our notes on this species were commenced this season early in June, at which time the larvæ were abundant in the alder leaves in the Arboretum, although none were noticed then on the native alders. The adults from these larvæ commenced emerging about the middle of July, and were abundant by July 20th. Full grown larvæ were spinning cocoons again abundantly during the latter half of August, and adults were again abroad in large numbers during the last few days of August, and the first week in September. Eggs were laid early in September, and larvæ were working in the leaves until the close of the season. The generations of the season overlapped so that medium-sized and large larvæ were present much of the summer, but there was a distinct succession of cocoons, adults and eggs at three times during the season, in late May and early June, in late July, and in the first week of September. There were three generations of larvæ in Ottawa this season, the last spinning the over-wintering cocoons.

Remedial Measures. The larvæ may be killed within their mines very easily with strong contact insecticides, if the application is made while the larvæ are small. Kerosene emulsion and Black Leaf 40 were tested in various strengths. Kerosene emulsion at one part stock to five parts water was fairly effective when applied to foliage containing larvæ of all sizes, with 94 per cent. killed; but was ineffective at one to seven, with only 68 per cent. killed. Probably kerosene emulsion at the strength of one to five would prove satisfactory in the early season while the larvæ were all small.

Black Leaf 40, at one part to 100 gallons of water, with five pounds of soap, killed all the larvæ in the foliage sprayed. This is the application recommended. It should be applied in late May or early June, as soon as the small brown mines appear on the leaves and should be repeated as often as new mines appear from reinfestation by late appearing adults or the migration of adult females from neighboring breeding grounds.

Immune Species of Alders. The various species and varieties of alders growing in the Arboretum are effected to very different degrees by the leaf-miner. Some are very badly affected with other varieties beside them showing no signs of the injury whatever; and there is evidence that individual trees of a variety possess varying degrees of immunity.

The Locust Borer, *Cyllene robiniæ* Forst.

The Black Locust trees of Ontario and Quebec are being so seriously injured by the Locust Borer that it seems advisable to draw attention again to the available means of control. The beetle and its habits are so well known, and have been so thoroughly discussed in literature that only the briefest outline will be included here.

The adult, a beautiful black and yellow-banded, long-horned beetle, slightly over half an inch in length, emerges from the infested trees during August and September, and is found feeding upon the pollen of goldenrod flowers, and laying its eggs in crevices in the bark of living locust trees. The beetles were active at Ottawa this season between August 14th and September 17th. They were captured upon a patch of goldenrod near the infested locusts, and in smaller numbers upon the trunks of the locust trees. A larger area of goldenrod a few hundred yards beyond the first yielded very few beetles. Apparently the beetles seek the nearest goldenrod pollen, and were to be seen flying back and forth between the locust trees and their feeding ground.

The beetles are found crawling upon the bark of the locust trunks and branches, mating and depositing eggs. The female searches with the very sensitive ovipositor in the bark crevices until a suitable place is found, and deposits there an elongate white egg, neatly and securely wedged into the crevice so that very little of the egg is visible, and more safely attached by a mucilaginous secretion coating the egg-shell. The larva emerges through the hidden end of the egg-shell, and bores directly into the inner bark, leaving the egg-shell and the entrance tunnel packed with castings. In the yellow living inner bark it excavates a small shallow cavity within which it remains quiescent until the following spring. During the dormant period of the trees the larvæ are therefore very small, immediately beneath the corky outer bark and with a short overlying mine connecting them with the exterior. In the spring the larvæ extend their tunnels into the wood, sometimes penetrating to the heartwood in branches or small trunks. The tunnels are commonly lengthwise, and are always kept connected with the exterior by an opening as large as the larva, through which the borings are thrust. When full grown, late in July or in August, the larva enlarges the end of its tunnel, closes itself in with chips, and changes to the pupa and then to the adult. The adult beetle leaves the wood through the hole kept open by the larva.

The injury to the trees caused by successive generations of larvæ girdles the trunks and branches partly or completely and kills the branches and areas of bark on the trunk until finally the tree succumbs. Branches and trunks of the smaller

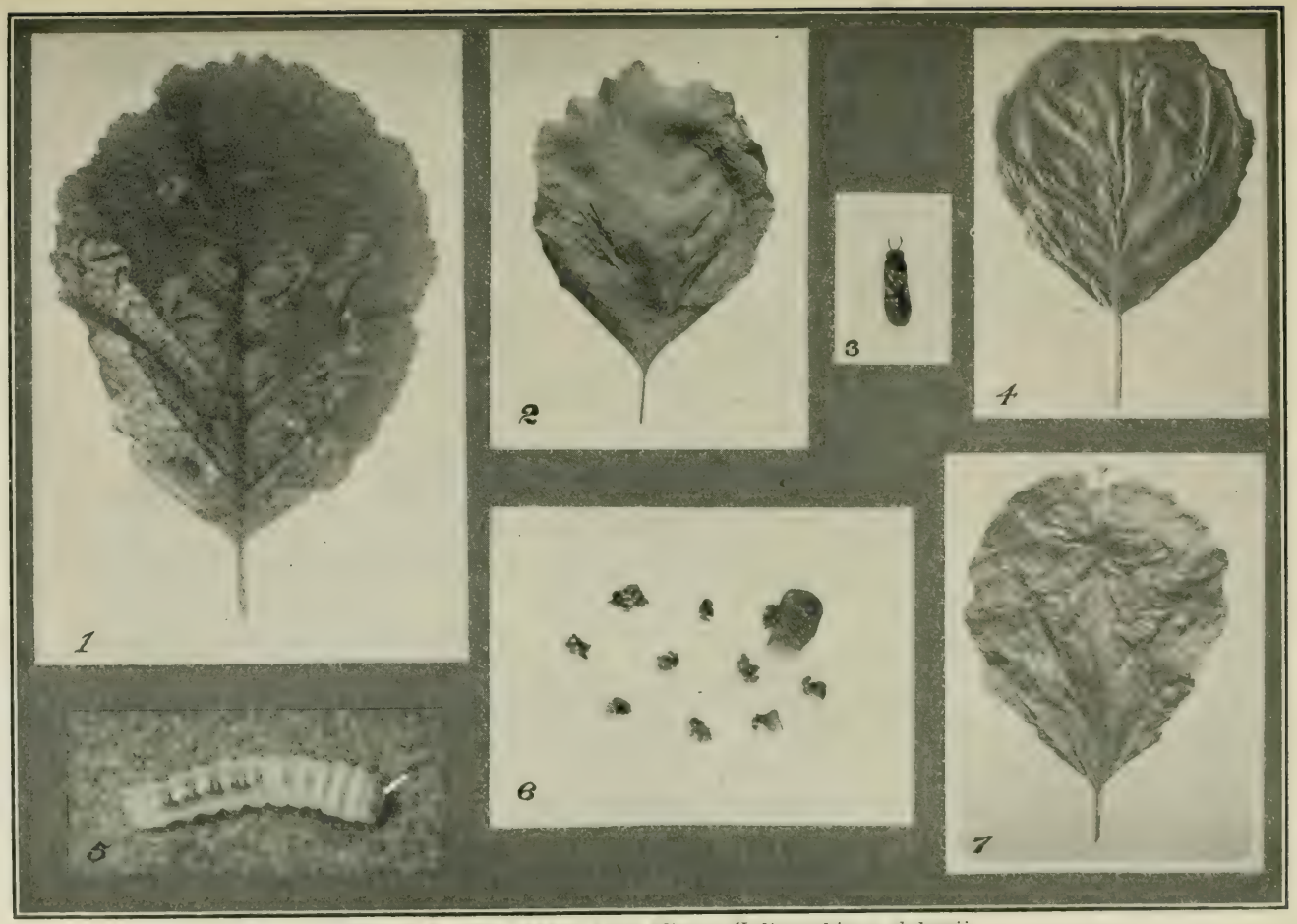


PLATE. 2.—The Alder Leaf Miner, *Kaliosyphinga dohrnii*.

Fig. 1.—Alder leaf showing the larvæ in their mines.
Fig. 2.—Larval mines.
Fig. 3.—An adult sawfly, enlarged.
Fig. 4.—Larval mines.
Fig. 5.—Larva, greatly enlarged.
Fig. 6.—Cocoons of silk encrusted with sand.
Fig. 7.—Larval mines entirely separating the upper leaf surface.

trees are often badly weakened by the numerous tunnels in the heartwood and are broken by heavy wind storms.

Methods of Control. Locust trees are grown in this country chiefly for shade or ornamental trees or in hedges. Any cutting or removal of trees will have to do chiefly with dead and dying trees and branches. It is very important in controlling borer infestations that the infested dying and useless wood be removed and burned before the middle of July, to prevent the spread of the beetles. The dying parts can be identified in the early season, and should be cut out as early as possible, and burned as soon as it has dried sufficiently.

If the wood is to be utilized the cutting should be done in winter, or before the end of March, the valuable parts barked to destroy the young hibernating larvæ, and the worthless remainder completely burned.

Spraying to Kill the Young Larvæ. The hibernating larvæ lie immediately below the corky outer bark and can be killed by spraying the trunks and branches between October and the end of March with a strong contact insecticide. The United States Bureau of Entomology has recommended kerosene emulsion at a strength of 1 part stock solution to 2 parts water for the purpose; and this strength has been used in our experiments with satisfactory results.

The Bronze Birch Borer, *Agrilus anxius* Gory.

The cultivated birches are being seriously injured by the Bronze Birch Borer throughout much of Southern Ontario, including the Ottawa Valley. The injury is caused by the young of the beetles, slender whitish grubs, which excavate long winding tunnels through the inner bark and sapwood of the small and large branches and trunks. The trees are killed, sometimes rapidly, and in some cases slowly but surely, by successive generations of grubs. A very large number of our finest cultivated birches have already been killed and cut down, and there is good evidence for fearing that it will eventually be useless to plant white birches in the localities infested by the beetle.

A careful study of the injury was undertaken by the Entomological Branch with the object of finding some effective method of control. We are not yet able to recommend safely any other than the drastic methods suggested by Professor Slingerland years ago.

The Trees Attacked. The varieties of the European white birch, *Betula alba*, are usually planted for ornamental trees in preference to our native species, and have suffered most severely; but our native yellow, white and black birches are killed by the borers when grown under cultivation. We have found the tunnels of the grubs in white and yellow birches in woodlands, but have never known the trees to be killed under natural conditions in the forests. It appears probable that certain varieties or possibly individual trees possess a certain degree of immunity from the borer attacks, and if this proves to be correct we shall have there a partial solution of the problem.

Evidence of the Injury. The infested tree usually dies gradually from top downwards, but by the time the top is dead the borers will be found working in a large part of the trunk and branches. The inner bark and sapwood may be thoroughly interlaced with their tunnels without much evidence of their presence appearing upon the outer surface of the bark. The infestation is betrayed to the careful observer, however, in the zigzag or winding ridges upon the branches overlying the tunnels in the sapwood, and in the "rusty" patches upon the trunk and larger branches, where sap is oozing from cracks in the outer bark caused by the tunnels within.

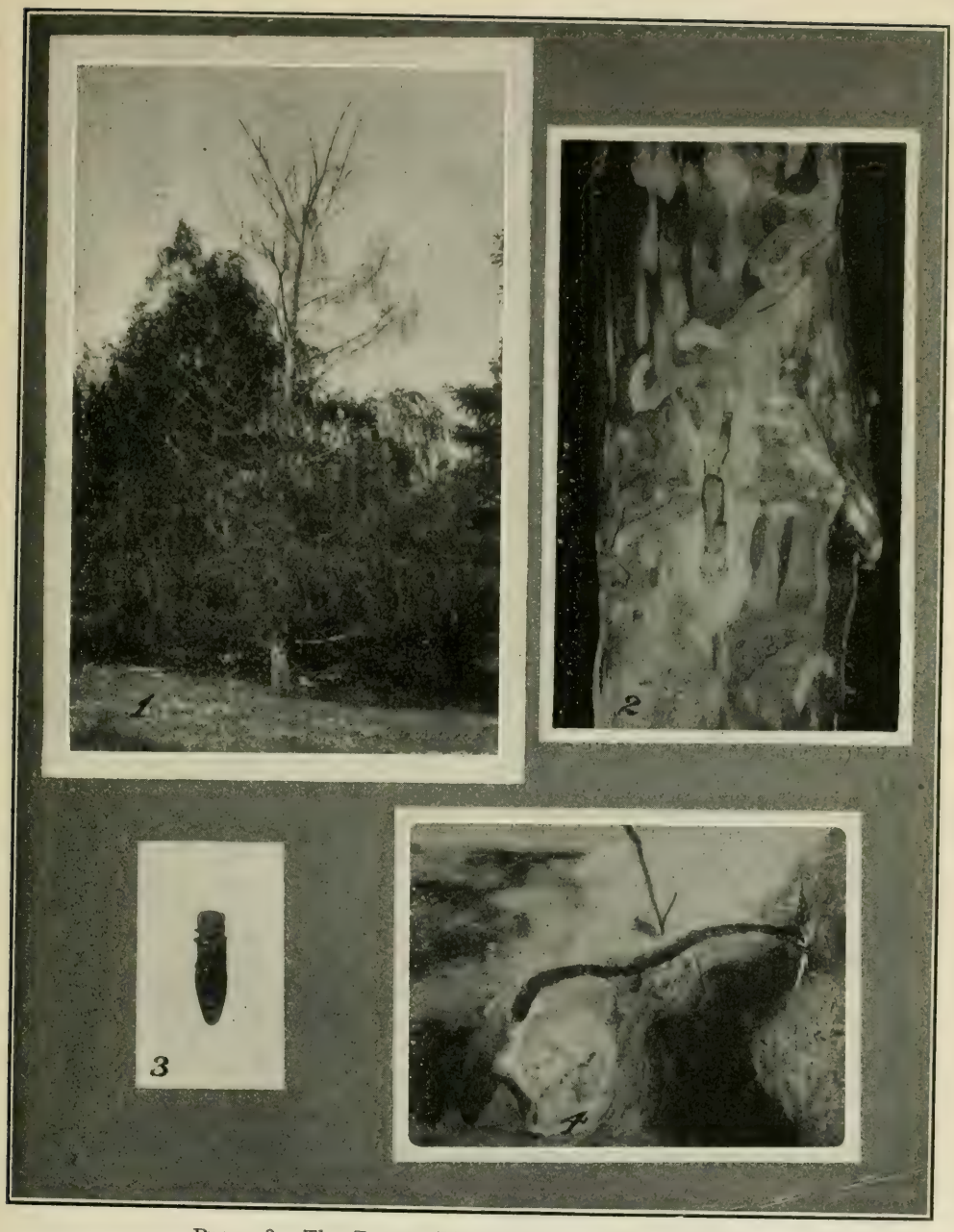


PLATE 3.—The Bronze Birch Borer, *Agrilus anxius.*

Fig. 1.—White birch injured by borers· top dead.

Fig. 2.—Larval mines on the wood surface; showing a larva in its hibernating cell.

Fig. 3.—The adult beetle.

Fig 4.—The commencement of a larval mine; one-half the entrance hole is shown at the white arrow; the mine passed slightly below the wood surface at the black arrow.

The Adult Beetle. The adult beetle is slender, somewhat flattened, dark olivaceous bronze in color and slightly less than half an inch in length.

The beetles emerge from the bark of the infested trees during June and July. At Ottawa this season, the first adult appeared in our cages on June 27th, and the first adults were taken on trees in the open on June 30th. The early part of the season was very wet, and the emergence of the beetles was undoubtedly retarded thereby, since heretofore we have found adults emerging as early as June 9. The date of emergence will vary considerably with the season, the locality and the latitude. It is possible that in the Niagara Peninsula beetles may sometimes emerge as early as the middle of May, since they are recorded from Ithaca, N. Y., as early even as May 1st. The beetles were found on the trees at Ottawa this season until July 28th.

The beetles were reported by Larsen as feeding freely upon leaves of willow, poplar, birch, elm and other trees. In our experiments they have fed very sparingly upon birch leaves, but could not be induced to feed at all upon willow, poplar or elm. Neither could we find any evidence of their feeding in the open upon those trees, nor to any considerable extent upon birch. We hoped to obtain a partial control by poisoning the adults, but so far have not been successful.

The Larval Mines. The females were frequently observed feeling with the ovipositor beneath bark scales, evidently searching for a suitable place for oviposition. Such places were marked and carefully examined, but neither in the field nor in our cages were we able actually to find the eggs. However, the newly started tunnels in the branches are easily traced backward to minute openings through the outer bark through which the freshly hatched larvæ have entered. It is evident that the eggs are deposited usually beneath the scales on the rougher portions of the bark of the branches and trunk. The larvæ enter the bark through minute openings, and bore directly inward through the bark to the wood surface. The tunnel is then continued between the bark and wood for a short distance, and is further continued in a winding or zigzag manner partly below the wood surface and partly between the bark and wood. Early in the autumn the mature larvæ excavate elongate hibernating cells in the ends of the tunnels a short distance below the wood surface, in which they pupate in the following season and emerge through the characteristic part-oval holes in the bark. In these cells the larvæ are folded, the cephalic third being bent over and closely pressed to the remainder of the body. At the close of the season there are, however, many smaller larvæ in the branches not more than one-half grown; these hibernate in normal tunnel-ends immediately below the bark, and continue their development the following season. There is evidence that in some individuals at least the life cycle lasts for two seasons.

Control Measures. The only method of control that we can safely recommend at present is to cut out all infested birches and burn the entire tree, including the small branches, before the middle of May. By the time the top of the tree is dead from the action of the borers, it is useless to attempt to save the tree, since the grubs are then distributed over most of the trunk and branches, as will be evidenced by the reddish patches upon the bark. All that can be done is to preserve for three or four years a mutilated relic, and at the same time retain an ideal breeding ground for the beetles from which they will spread to the remaining birches of the neighborhood.

The results of the most promising of our control experiments will not be definitely determined for another year or longer; and in the meantime we can only urge owners of ornamental birches to watch carefully for evidence of the

presence of this destructive borer, and to adopt promptly the drastic measures that seem at present necessary for saving the remaining trees.

Parasites. The larvæ with which we worked this summer were very heavily parasitized, while the number of beetles to be found on the trees in the open was surprisingly small. The birches about Ottawa apparently have been dying more slowly during the last few years than heretofore, and it is possible that this may be accounted for by an increase in the number of the parasites.

Prof. Caesar: I should like to ask Mr. Swaine how many species of birch are attacked by the Bronze Birch Borer.

Mr. Swaine: We have a considerable number of species of birch in the Arboretum where our work was carried on, and there is a distinct difference in the species in the degree of immunity to attack by borers. We find the native species attacked and even killed when in isolated conditions under cultivation; out in the woods I find the native birches attacked by the borers not infrequently, but have never known the trees to be killed under such conditions. In connection with the Alder Leaf-miner we find that the different species and varieties of *Alnus* differ widely in their susceptibility to attack; some are very badly infested, and some show little or no evidence of injury.

Dr. Howard: I was out in Ashland, Oregon, last summer, and for the first time saw the method of determining the damage by Dendroctonus beetles at a distance. Our man was able to point out at a distance Dendroctonus-injured trees. I was interested in Mr. Swaine's statement about the killing off of the new growth by the severe weather of last winter, and I was wondering whether it was possible to detect this killing at a distance, and to distinguish it from Dendroctonus-killed timber. I should be interested to have Mr. Swaine tell us just what the difference is.

Mr. Swaine: The frost-injured trees are usually in a definite belt situated along the sides of the mountains, and the effect may be seen for years, although most of the trees may recover. On Mt. Rundle at Banff, Alberta, there is a belt of such injury still showing, which occurred nine years ago. In the early season following the injury, the foliage appears yellow and gives a decidedly yellowish tint to the belt; in some cases many of the trees actually die. One sees this injury in a definite belt between certain altitudes on the upper benches. The Dendroctonus injury on the other hand appears as clumps of dead trees, "red-tops," with isolated dead trees here and there. There may be from three or four to fifteen or thirty red-tops, or more, in each clump, with here and there isolated trees. The injury is quite characteristic in the earlier stages.

Mr. Harrington: Does a small moth that appears in terminal twigs of the yellow pine do much permanent injury? It disfigures the trees greatly by forming large masses of gum, and appears in the terminal shoots. Have you performed any experiments with this insect?

Mr. Swaine: I do not think that species does very much damage except in disfiguring the trees. There is one particularly injurious species known to me occurring in southern British Columbia affecting yellow pine. Near Okanagan Landing there is a large patch of timber in which many trees are badly injured or killed by a species which bores in the cambium of the branches, not in the trunk, but around the branches so that it girdles and kills them. Of course all through that country there is the injury to the tops caused by boring caterpillars.

Mr. Harrington: Is the black pine attacked also by Dendroctonus?

MR. SWAINE: Yes, especially when mixed with yellow pine.

PROF. ZAVITZ: I was very much interested in Mr. Swaine's reference to the turning of logs in the booms. This work can be of great economic value to the lumbermen in our northern country, because I have known lumbermen to get gangs of men and put them on the booms all summer to turn the logs, and when they get such scientific information they will turn their logs less frequently.

MR. WINN: Does the Locust Borer resort to other flowers to any extent besides the goldenrod?

MR. SWAINE: We have found it only on the goldenrod. We have a nice patch of goldenrod a short distance away from our block of locust trees, and we get the beetles flying back and forth between the flowers and the trees.

MR. WINN: Some people built a house along side of mine, where I had a very fine patch of goldenrod, and the nearest place where they came from, and I cannot find them on any other flowers at all that were apparently equally attractive. I have never been able to see the beetles on the locust trees, but do not get a chance to go up in the daytime.

MR. DEARNESS: Why is the brush useful against the Monohamnus beetles?

MR. SWAINE: It is because of the shade they provide. The beetles love the sunlight. We often see them on a fallen tree lying in the sunlight, but with a portion in the shade; the mating beetles will be found invariably upon the sunny end, and the shaded end will accordingly have few or no eggs laid upon it.

PROF. ZAVITZ: I had a very interesting experience in that connection at one time. One summer in collecting I noticed a tree had fallen from the dense woods out into the road, and I used to go to that tree during June and along early in July, where numerous specimens were to be found just outside the fence where the tree was in the sunshine, but in the shade I never found a specimen.

MR. SWAINE: It is a very convenient habit for we can use our knowledge of it in protecting logs which have to be left in the woods.

MR. DEARNESS: Does the temperature have anything to do with the hatching?

MR. SWAINE: I do not think the females would go into the dense shade to oviposit at all.

MR. HARRINGTON: I think most of the Cerambycidæ prefer to oviposit in the sunlight.

NOTES ON SOME INSECTS OF THE SEASON.

L. CAESAR, O. A. C., GUELPH.

It may be worth mentioning that in the Niagara district at least, and apparently in most other parts of the Province, there was a wonderful diminution in the number of most kinds of insects this year, compared with the average season. This may have been due to the abnormally wet May and June destroying the immature stages.

THE CLOVER-HAY MOTH (*Hypsopygia* (*Pyralis*) *costalis*).

This year for the first time I found the work of this moth on a large scale on July 13th, at Wellington, Prince Edward County. Pea straw from the canning factory had been dried and stored in an open shed some two or more years ago, and in this the insect had bred. At the time of my visit most of the adults had emerged, though there were still a good many pupæ and a few larvæ. The moths

were so numerous that they were to be seen in thousands on the inner side of the walls and roof. I pulled out the straw to a depth of a yard, and found that the larvæ had been working at least that far in. They had fed both on the straw and on the empty pods. The pupæ were all near the outside. Along with this species was a considerable number of the Meal Snout-moth (*Pyralis farinalis*), the larvæ of which had doubtless fed on the peas that had been left in the straw.

Evetria albicapitana Busck.

This pretty Tortricid described by August Busck, in 1914, as a new species was found in considerable numbers in the forestry plantation at St. Williams, on June 9th. The larvæ feed on the bark of the new growth at the axils of the twigs

Evetria albicapitana Busck.
Moth and gum mass caused by larva on twig of Jack Pine. Natural size (original).

and cause irregularly globular to irregularly hemispherical gum masses from 1-3 to ¾ of an inch in diameter. They seldom, if ever, completely girdle the twig or cause it to die. There were sometimes two or more gum masses on each branch, but even so the branch looked uninjured. On June 9th a few of the live pupæ

were still to be found in the gum, but about 90 per cent. had emerged. The adults were present, and flew out from the trees when disturbed or dropped as if dead to the ground, where their yellowish brown color made them very difficult to distinguish from the fallen staminate flowers. Three females and one male were placed in a bottle along with two fresh new-growth twigs and brought home. After a few days eggs were laid near the base of the young leaf clusters, some separately and some in very irregular clusters, one egg overlapping another shingle fashion. It is doubtful whether in the open they would be laid in clusters. The eggs were cream-colored, flattened, or scale-like and oval in outline, about .5 mm. long by .4 mm. wide. They darken before hatching. Jack Pine (*Pinus banksiana*) (*divaricata*) alone was attacked. (See figure of moth and work of larva.)

The Willow and Poplar Curculio (*Cryptorhynchus lapathi*).

Once more we have found adults of this species in the spring in the nurseries. The excessively wet weather prevented our watching them to see whether they laid any eggs. The insect has been reported from the following places in addition to those given in my last year's account of it: Port Elgin in a nursery, Beachville, Strathroy and Lake Simcoe district. Mr. George Matieu, has also informed me that he has taken it on *Populus deltoides* in a nursery at Berthierville in Quebec.

Fruit-tree Leaf-roller (*Tortrix* (*Cacoecia*) *argyrospila*).

Up to the present time there have been no reports of the presence of this pest in any other orchards than those mentioned in my paper on Apple Leaf-rollers last year. I visited two of these orchards this year in June and July. In the orchard near Hamilton, the insect seems to have largely disappeared, in the other orchard —the large block of 60 acres in Norfolk County—it still persists, and has now spread throughout all the trees. I have had no chance to visit this orchard since the eggs were laid, and so form an opinion on the amount of destruction the insect is likely to do next year. The foliage in the orchard this year was kept heavily covered with nearly double strength of arsenicals, but the result showed clearly that arsenicals alone would not control this pest. Nine or ten acres of spy trees which formed the worst infested part last year, were sprayed this spring before the buds burst with Scalecide, and were noticeably freer from injury than the unsprayed parts. The owner believes that in spite of the cost, he will have to use Scalecide on the whole orchard next spring. In the orchard near Hamilton, the worst infested block was also sprayed with Scalecide, and apparently this was the reason for the great decrease there in the number of the larvæ.

The Oblique-banded Leaf-roller (*Tortrix* (*Cacoecia*) *rosaceana*).

The following additional data was obtained on this pest:

1. The number of eggs that may be laid by a single female is much greater than we had suspected. One female laid one large and two small clusters, or a little over 300 eggs in all. The highest number of eggs we found in a single cluster was 175; the average seemed to be about 100.

2. This species in Ontario is partly single brooded and partly double brooded. In our cages all the larvæ reared from the eggs laid on leaves in June and early July fed for a short time on the foliage, skeletonizing it very much in the way the Pear Slug skeletonizes pear and cherry leaves, and then while still not farther

advanced than the second instar each larva spun about itself a little silken case or hibernacula. I examined some of these hibernacula on August 26th, and found the larvæ still healthy and looking the same as when the cases were constructed. Some of the hibernacula were on very small twigs and were situated alongside the terminal bud; others on these same twigs were in the axil of the leaves, but attached to the twig not to the leaf; others were situated on larger branches in various positions. The latter were usually about the shape of a bud scale and dark on the outside, lined with white silk and easily mistaken for the hibernacula of the Bud Moth. The former were usually whitish in color, from 3 to 5 mm. long and about 1 mm. in diameter.

It is clear, however, that not all the larvæ of this brood formed hibernacula, because throughout most of August we found larvæ, some a little more than half grown, others full grown, and from these we reared adults. We also found adults at Guelph, and at Grimsby, up to September 27th. To make sure there was no mistake we sent these to Mr. August Busck, who verified our determination. Unfortunately our having to shift our quarters from Grimsby to Guelph at the end of August, prevented us from carrying the life-history through. Prof. Herrick, however, states that there is no doubt that eggs are laid in the fall on the bark and that these winter.

Mr. A. G. Dustan, Annapolis Royal, Nova Scotia, in the 1915 report of the Nova Scotia Entomological Society, states that the insect in Nova Scotia winters in the immature larval stage in hibernacula. He seems to imply that this is the only stage in which it winters there.

Red-necked Agrilus (*Agrilus ruficollis*).

A red raspberry plantation near Grimsby was much injured by the larvæ of this insect; the injury was much greater than I had ever seen before. Approximately 25 per cent. of all the canes were infested, and in consequence the crop was lessened to about that extent. An examination of the new canes at the middle of August showed that the injury next year would be as great as this year. Since the adults do not emerge until long after the leaves are out, and since the tops of a large percentage of the infested canes die before the adults leave them a very helpful means of control would evidently be to go through the plot about a month after the leaf buds burst and remove these canes, cutting them low down to be sure of not missing any of the insects in them, and then burn all the cut canes promptly. The tendency of this pest to localize itself was well shown by the fact that it was doing very little injury in any of the surrounding plantations of the same or different varieties.

Apple Capsids or Mirids.

Some further study of certain points about these Leaf-bugs has been made and the following data obtained:

1. *Neurocolpus nubilus,* or the Clouded Leaf-bug as we may call it, has almost disappeared from the large Norfolk apple orchard where it had been very abundant for several years. On July 9th in a half day spent in the orchard I saw only 15 of these. The disappearance was not due to lack of eggs for many of these had been laid last summer. It may have been due to the very wet weather this spring.

2. In at least some of the orchards *Lygidea mendax*, the so-called False Red-bug, was much less numerous than last year. One of these orchards had been sprayed

with a tobacco extract and was almost totally free from the pest. The spraying doubtless helped to bring about this result.

3. The eggs of *Neurocolpus nubilus* do not hatch until more than a week after the blossoms drop, or in fact until after the Codling Moth spray has been applied. This was true last year as well as this year. The first nymph seen this year was on June 9th. The two species of Red-bug, *Heterocordylus malinus* and *Lygidea mendax*, began to hatch a week or more before the blossoms opened. The most practical time to spray for these latter two is just after the blossoms fall, combining tobacco extract with the Codling Moth spray for the purpose. This date, however, would be worthless against *Neurocolpus nubilus* as it would still be in the egg stage, Moreover, as we discovered last year, tobacco extract even at three times the usual strength for green aphids is ineffective against this pest; for it merely stupefies the nymphs and they soon recover. A soap solution, such as one pound of Sunlight soap to 10 gallons of rain water was found satisfactory.

4. The time of the appearance of the adults of the different species this year as observed by us was as follows:

Heterocordylus malinus, June 23rd in the cages, a few a little earlier in the orchard.

Lygidea mendax, June 29th,

Paracalocoris colon, July 6th.

Neurocolpus nubilus, July 10th.

5. Apparently *Lygus communis*, Knight, n. s., the troublesome False Tarnished Plant-bug of New York, and Apple Green Bug of Nova Scotia if present in Ontario plays no part, or a very small part, in injuring apples and pears. *Lygus invitus* occurs almost everywhere, but as shown by Knight does not attack fruit trees.

Local Pests.

Melon Aphis (*Aphis gossypii*) was very abundant and destructive on melon plants in Kent County.

Beet Leaf-miner (*Pegomyia vicina*) injured severely the foliage of mangolds north of Brockville.

Corn Seed-maggot (*Pegomyia fusciceps*) nearly destroyed some fields of beans in Prince Edward County. The fields had been in sod.

Zebra Caterpillar (*Mamestra picta*) was abundant enough on turnips in part of Peel County to be an important pest.

Hickory Leaf-roller (*Eulia juglandana*) was very common on hickory trees in some parts of the Niagara district.

American Tent-caterpillars (*Malacosoma americana*), though rapidly diminishing in numbers east of Toronto, were very abundant at Oakville and Port Credit, and also in parts of Norfolk and Lambton Counties.

Blackberry Leaf-miner (*Metallus bethunei*) attacked in considerable numbers the blackberry foliage at Vineland.

Pear Slug (*Eriocampoides limacina*) was conspicuous by its absence in the Grimsby district.

THREE IMPORTANT GREENHOUSE PESTS RECENTLY INTRODUCED INTO CANADA.

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It is important that attention be directed at this meeting to three serious greenhouse pests which have recently been introduced into Canada, namely, the Florida Fern Caterpillar, the Chrysanthemum Midge, and the Rose Midge.

THE FLORIDA FERN CATERPILLAR, *Callopistria* (*Eriopus*) *floridensis* Gn.

This southern insect which was described from Florida in 1852 has occasionally been recorded as a serious greenhouse pest. In the Year Book of the United States Department of Agriculture for 1908, the Bureau of Entomology records important losses in greenhouses in Washington, D.C., one florist reporting damage to ferns to the extent of $4,000. This is apparently the first record of this insect as an economic pest. In addition to being destructive in the District of Columbia, this insect has since been recorded as doing serious damage to ferns in the States of Florida, New Jersey, Illinois, Georgia and Ohio. The caterpillar is also believed to have occurred on ferns in Louisiana. Hampson[1] records the species from Florida, Mexico, Guatemala, Costa Rica, Bahamas, Jamaica, Cuba, Haiti, Sta. Lucia, St. Vincent, Venezuela, Br. Guiana, Brazil and S. Trinidad.

The first occurrence of the Florida Fern Caterpillar in Canada was noted in September, 1915, in the greenhouse of Mr. A. M. Barton, Weston, Ont. The caterpillars were found on some ferns imported from Chicago, and the insect had doubtless been introduced with such shipment. During the winter of 1915-16 we had an opportunity of studying the life-history of the insect and observing its habits. Recently Mr. Hall, of Messrs. Hall and Robinson, forwarded to us specimens of the larvæ from their Montreal West greenhouses, where they were first observed in September, 1916.

LIFE-HISTORY.

The Egg.

We have been unable to secure eggs of the moth, either by searching in the greenhouse referred to or from living moths kept under observation in captivity. Mr. C. E. Petch, Field Officer of the Branch, and the writer have both examined ferns which were being destroyed, as has also Mr. Barton, without any eggs being detected. Davis[2] describes the egg (laid in confinement) as "circular in section, about one-fiftieth of an inch in diameter, slightly flattened, ribbed longitudinally and transversely," and states that in color it "is pale greenish with a faint yellowish tint, much resembling the color of the new fern fronds." The same author states that in confinement the moths deposited their eggs singly on the under surface of the new leaves. Weiss[3] records an incubation period of from five to seven days.

[1] Cat. Lep. Phalaenae in the Brit. Museum, Vol. VII., p. 549.
[2] 27th Report State Entomologist of Illinois.
[3] Can. Ent., XLVII, 23.

The Florida Fern Caterpillar, *Callopistria floridensis* Gn.

Fig. 1.—Two forms of larva.
Fig. 2.—Cocoon.
Fig. 3.—Moth at rest.
Fig. 4.—Female moth.
Fig. 5.—Male moth.
Fig. 6.—Boston fern plant, showing injury by larvæ.
Fig. 7.—Tip of frond destroyed by larvæ.
(Original.)

Description of Larval Stage.

During January, February and March, 1916, several lots of larvæ representing various stages were received at Ottawa. From these the following notes were made:

First Instar. Length 3 mm. Body pale green, no markings. Head concolorous with body, ocelli black. Tubercles black, conspicuous, each with a single, rather long hair. Thoracic feet semi-translucent; prolegs concolorous with body. Spiracles black.

Second Instar. Length 5.5 mm. Head pale green, shining, of a glassy appearance, ocelli black, mandibles reddish. Body pale green with the following rather indistinct stripes: addorsal, subdorsal, and a stigmatal band, all pale whitish in color. About midway between tubercles ii and iii is a rather wide, conspicuous, blackish band. Tubercles black, setæ dark. Feet concolorous with body.

Third Instar. Length 9 mm. The larva in this instar is similar to second instar but the longitudinal stripes are now quite distinct, the addorsal being sinuous in outline. Spiracles pale yellowish, rimmed with black.

Fourth Instar. Length 14 mm. Head green, cheeks pale brownish, clypeus margined on outer sides with blackish. Body green with a more or less yellowish reflection. All the markings distinct: addorsal and lateral stripes and stigmatal band yellowish, the two former quite sinuous in outline. Subdorsal stripe margined below, as before, with a blackish band. Thoracic shield margined anteriorly with black. Spiracles yellow, black rimmed. Feet concolorous with body.

Fifth Instar. Mature Larva. Length 28 mm. Head reddish brown, reticulate with dark brown; clypeus with pale margins; ocelli black; epicranium adjoining clypeus brownish; a noticeable pale space without markings is present immediately above base of each antenna. The color of the body is now totally different, being raw umber,[1] with a faint greenish tinge. The stripes are inconspicuous unless examined with a lens and of a sordid yellowish-white color. All are sinuous in outline. Tubercles blackish, each distinctly surrounded with a ring of sordid yellowish-white; setæ blackish; spiracles pure white with black rim. Between tubercles i and ii there is a conspicuous yellowish-white spot, and on each segment midway between the stigmatal band and subdorsal stripe, a lateral row of the same colored spots. The skin below spiracles is also spotted and streaked irregularly. The stigmatal band on the thoracic segments is partly filled with pale yellow, particularly on segment 2 and in the anterior half of this segment the color is white instead of yellow. Anterior edge of thoracic shield dark brown, forming a distinct band. Thoracic feet shining, pale brown; prolegs dull, concolorous with venter. Length when mature 33 mm.

The above notes were made upon a single larva received on March 1, which was collected with many others by Mr. Petch on February 29.

In February (1916) several larvæ in last stage were received from Mr. Barton. All but one were green, the exception being of a dull reddish color. In the sending from Mr. Petch, received on March 1, several instars were represented. All these specimens were also green, with the exception of two, one of the latter being a dull brown and the other a beautiful reddish-chocolate color. The mature specimens were described as follows:—

Green larvæ.—Length 32 mm. Body yellowish-green. Markings as follows: An addorsal line, a subdorsal line, a lateral line, and a rather indistinct stigmatal

[1]According to Ridgeway, Nomenclature of Colors, 1912.

band, all whitish-green in color. In some specimens the skin between the subdorsal line and the lateral line is of a darker green color and for this reason contrasts rather strongly. Close to the spiracles there are one or two blackish spots on each of the central segments. On the thoracic segments and, in some individuals, on the two or three posterior segments, these spots are more frequent and form a distinct, uneven band, widest on the thoracic segments on segment 2. The color of the intersegmental folds particularly on dorsum is yellow, spiracles cream-colored, ringed with black. Thoracic shield slightly paler than color of dorsum and having a distinct band of black along anterior edge, which joins with the band on sides of thoracic segments. Ventral area glaucous. The head varies in color from pale green with a light tinge of reddish-brown on cheeks to a decided reddish-brown over whole upper portion of cheeks; clypeus bordered on either side with a blackish, rather indistinct, band; mandibles reddish; ocelli blackish, a blackish patch above ocelli.

Brown larva.—Length when extended 37 mm. Head same as in green specimens, but with brown reticulations. Body dull velvety brown with a purplish reflection. Longitudinal lines pale whitish, indistinct. Tubercles blackish, circled with pale whitish. Spiracles cream-colored. The lateral spots close to the spiracles which were black in the green larvæ are in this specimen white and conspicuous, continuing as a striking band on the thoracic segments. Thoracic feet reddish-brown; prolegs concolorous with venter.

Reddish-chocolate larva.—Similar in general to the dull brown larva but having a wide continuous white stigmatal band, as shown in figure 1, page 112.

On March 27 another mature green specimen was described as follows: Length at rest 28 mm. Head 2.8 mm. wide, yellowish-brown; clypeus paler; ocelli black. Body green, slightly darker than the leaves of Boston fern. Stripes yellowish-white as in other specimens. Stigmatal band with more yellow than dorsal and subdorsal stripes and with white areas on first two thoracic segments. Spiracles more or less surrounded with dark purplish-red, particularly on central segments. Thoracic shield paler than body. Venter pale green.

From the above notes it will be seen that the larvæ varied considerably, particularly in color. Such variation has also been noted by Davis[1] and Chittenden.[2] The former, referring to such variation, says: "There are two types of the full-grown caterpillars, one apple-green and the other velvety black, the former predominating." As indicated above, the dark-colored specimens which we examined were of a dull brown color, none were black. The band which extends across the front of the thoracic shield is very distinct and constant, and should serve as a characteristic mark to determine the species.

Description of Cocoon and Pupa.

Most of the larvæ under study were kept in a large breeding cage in which an average sized Boston fern was placed. When the specimens in such cage reached maturity they left the plant and made earthen cocoons (Fig. 2, page 112), on the surface of the soil. The earth chosen for the making of the cocoon is held together by many strands of silk which gives the structure considerable strength. It is by no means fragile, as are the earthen cocoons of our common cutworms belonging to the genus *Euxoa*. In length the cocoon varies from 18 to 20 mm. and in width from 6 to 7 mm.

[1]Davis, J. J., 27th Report of the State Entomologist of Illinois, 1912, p. 91.
[2]Chittenden, F. H., Bulletin No. 125, U.S. Bureau of Entomology, 1913, p. 7.

Pupa.—Length 12-15 mm., 5-6 mm. wide; shining reddish brown, darker at posterior end; cremaster two-spinned, the spines short, stout, and projecting outwardly towards the venter. Wing-covers prominent and slightly wrinkled.

Length of Larval and Pupal Stages.

The larva described in the five instars, received at Ottawa on March 1, was, as noted, 3 mm. in length, and undoubtedly a day, or at the most 2 days in age. It reached maturity on March 26, on which date it began to make its cocoon. By the morning of March 29 the pupa was formed. Another larva also began to make its cocoon on the same day and in this instance too the pupa was formed on the morning of March 29. The larval period, therefore, was about 27 days.

These larvæ had been kept separately in specimen tubes in which there was some earth. Each spun its cocoon on the side of the tube which rested on the earth in the breeding cage. Only sufficient of the earth was used by each larva to make a suitable cover, the glass furnishing the bottom, so to speak, of the cocoon. The obtaining of the length of the pre-pupal period, therefore, was a simple matter.

A moth emerged on April 12 from one of the two pupæ mentioned, the pupal period in this instance being 14 days. The second pupa died. Moths from other pupæ emerged during the period April 1 to 10.

Description of the Moth.

The moth is a rather striking species and quite different from any other form found in Canada. At first glance it reminds one of certain species of the old genus *Plusia*. The fore-wings in general are brown, with a darker velvety, rather V-shaped costal area near the centre of the wings. Towards the apex of the wings and at the base of each wing the color is also dark brown. Some specimens are, in general, of a darker brown shade than others. The markings on the wings are shown in the figure herewith. (Figs. 4, 5, page 112.) The bands across the fore-wings are whitish tinged with pink. The hind wings are of a uniform paler brown color, lighter towards the base. The body corresponds in general to the color of the wings. In the male there is a conspicuous widening of the antennæ near the head. The legs are conspicuously tufted. With the wings expanded the moth measures from about 30 to 34 mm.

Habits.

Food Plants. The ferns attacked in Mr. Barton's greenhouses, Weston, Ont., were Boston, Whitmani and Scotti. Mr. Petch visited the greenhouses on February 29 and found that over 75 per cent. of the fronds had been destroyed. In the Montreal West greenhouse the same varieties were attacked, about 200 plants being more or less injured.

Nature of Injuries. The caterpillars are very active feeders and when several occur on a single plant they soon effect serious damage. Like other noctuid larvæ they prefer the young and tender leaves but will readily attack the older and larger leaves, and even eat into the more tender portions of the stems. In an experimental cage one frond measuring 16 inches in length was entirely denuded by one last stage larva in four days. Mr. Petch, at the time of his visit in February, noticed that the smaller larvæ when disturbed dropped from the plants by means of a silken thread. They were found feeding early in the afternoon. In report-

ing upon the injury he referred specially to the destruction of the growing tips of the fronds before they unroll (see fig. 7, page 112).

On May 10 I visited Mr. Barton's greenhouses and examined his stock of ferns which had been attacked by the caterpillars. They were, indeed, an unsaleable lot, the fronds of most of them being eaten to a greater or less extent and in many instances the plants almost entirely defoliated. Many had been destroyed to the extent shown in figure 6, page 112. Mr. Barton informed me that when the outbreak was at its height from three to a dozen larvæ could be shaken from a plant growing in a 5-inch pot. A large stock, particularly of Boston ferns, were in the houses, very few of which had been sold during the entire winter. Mr. Barton estimated that his loss would easily total one thousand dollars.

When not feeding the caterpillars rested on the stems chiefly towards the base of the plants. The moths being nocturnal in habit are seldom seen during the day time.

On November 4, 1916, I again visited Mr. Barton and found that the insect had re-appeared in the greenhouse. The latest month in spring during which caterpillars were found in the greenhouses was June. During the summer 2,500 ferns were placed outside in a cold frame, no ferns being kept in the greenhouses during the summer of 1916. About the middle of August the caterpillars were noticed to be destroying the ferns in the cold frame. About 2,000 ferns, in fact, were so badly infested that they were destroyed. The remaining ferns from the cold frame were brought into the greenhouse about October 1st and it was on these plants that the caterpillars were feeding at the time of my visit on November 4.

Towards the end of November, 1916, Messrs. Hall and Robinson, Montreal West, Que., informed us that they also observed the caterpillars feeding outside in a cold frame, the plants attacked being Holly Ferns and also *Pteris albolineata* and *P. winsetti.*

Means of Control.

The following methods of control were adopted in the Weston greenhouse:

Tobacco Smoke. In January fumigation with tobacco smoke was tested twice within twenty-four hours, the strength in each experiment being two pounds of tobacco stems to 16,000 cubic feet of space. At the time of the fumigations many larvæ were present. Two days later Mr. Barton could not find a single caterpillar, dead or alive, and he thought at the time that the fumigation had proved entirely successful. Later (February 24, 1916), however, the caterpillar re-appeared, but he reported that such fumigation would not be then possible owing to the fact that the houses contained many small seedlings.

Handpicking. Large numbers of the larvæ were destroyed by handpicking in the Weston house. On occasions the pots were shaken individually and the caterpillars which dropped immediately destroyed. In the United States, also, this rather laborious method has been successfully used. When the shaking is done over the ground the caterpillars are simply crushed with the foot as they fall.

As mentioned above the moths are nocturnal in habit. Oftentimes specimens may be disturbed in the house or may be attracted to a bright light hung in the evening near infested plants. An endeavour, of course, should be made to destroy all specimens seen.

Arsenate of Lead. Experiments with arsenate of lead did not prove successful. Two sprayings at the strength of one-half pound of arsenate of lead to ten

The Chrysanthemum Midge, *Diarthronomyia hypogaea* H. Lw., and the Rose Midge, *Dasyneura rhodophaga* Coq.

Fig. 1.—Galls on leaves of chrysanthemum resulting from the attack of the Chrysanthemum Midge.
Fig. 2.—The Chrysanthemum Midge, much enlarged.
Fig. 3.—The egg, larva and puparium of the Rose Midge.
Fig. 4.—Showing rose bud destroyed by larvæ of the Rose Midge.

Figs. 1, 2 and 4 original; 3 redrawn after Webster.

gallons of water were applied at an interval of five days. Later the plants were again sprayed twice at double the above strength, but even at this latter strength control was not secured. In addition, too, the white deposit remaining from such sprayings was difficult to remove even with forceful watering.

Pyrethrum Insect Powder. Sprayings with fresh pyrethrum insect powder in the strength of two and one-half ounces to five gallons of water were recommended. In New Jersey[1] the following spray has proved successful:

Fresh pyrethrum insect powder	1 ounce.
Common laundry soap	½ ounce.
Water	1 gallon.

The soap should be dissolved in a small quantity of warm water after which the insect powder and water should be added to make up one gallon of mixture. One large fern grower applied such a spray once a week for five or six weeks. The insect powder applied dry by means of a bellows also gave satisfactory results.

The Chrysanthemum Midge, *Diarthronomyia hypogæa* H.Lw.

In 1915[2] the Chrysanthemum Midge was found to be thoroughly established in a large greenhouse at Ottawa. It had undoubtedly been introduced on some chrysanthemum plants imported from the United States. In addition to the Ottawa infestation we have recently received infested material from a florist in Victoria, B.C. This latter outbreak occurred in the greenhouse of Mr. A. J. Woodward, and the injury was first noticed in August, 1915, on chrysanthemums growing outside as well as within the greenhouse. Although these two occurrences are the only Canadian records we have, it would not, of course, be surprising to learn of other greenhouses being infested. Felt[3] states that he has received the insect from the States of Michigan, California, and Oregon, and the same author has recently informed me[4] that during the present year (1916) he also received the species from the States of South Dakota, Washington and Delaware. The pest is, therefore, widely distributed in North America. In referring to its "Distribution and future probabilities" Felt[5] says: "This species has been recorded from central and southern Europe, and, as stated above, it has already become established in several widely separated localities in this country, probably by the shipment of infested plants or cuttings. It was very likely brought to America without the normal quota of parasites and for a time at least it may prove to be a somewhat difficult insect to control, though it would seem as if the native parasites of our large and varied gall midge fauna might in time prey most successfully upon this midge."

Life-history.

The Egg.

The egg is small and in color pale orange; in shape elongate-oval. It is described by Felt as "Reddish-orange, length .15 mm., diameter .03 mm., the extremities narrowly rounded."

On April 8, 1916, a female was enclosed with a small plant beneath a bell jar. While under observation she was most active running about on the new leaves,

[1]Weiss, H. B., Can. Ent., XLVIII, 141.
[2]46th Rep. Ent. Soc. Ont., 1915, 14.
[3]31st Rep. N.Y. State Entomologist, 51.
[4]In litt., 16 Oct., 1916.
[5]31st Rep. N.Y. State Entomologist, 54.

the favorite places chosen for oviposition being the leaf hairs near the crevices between the young forming leaves. Repeatedly the female would come back to apparently the same spot. With the exception of an absence of seven minutes, the female was observed to be actively engaged in such conduct for a period of twenty-seven minutes. On another occasion eggs were found near the tip of another plant, and were laid, as Felt has already recorded, along the surface of the leaf among the leaf hairs. On one occasion (October 27, 1916), in the Ottawa greenhouse a string of extruded eggs was found attached to a dead female which had not been able to free itself from the gall, and other eggs laid among the leaf hairs were present on the gall. Altogether 44 eggs were counted. The length of the egg stage is estimated by Felt to be probably twenty-four hours or less.

The Larva.

The mature larva is very similar to that of other cecidomyids; in color it is yellowish, or yellowish-orange, in shape plump, rounded at either end, the segments being distinct; in length about 1 mm.

The Pupa.

The pupa is about 1.75 mm. in length. The abdomen is whitish or pale-yellowish; thorax and wing covers pale yellowish-brown, cephalic horns distinct, eyes showing black; leg-cases whitish or pale yellowish.

The Adult.

(Fig. 2, page 117.)

The midge is a small two-winged fly, the length of the body being about 1.75 mm. The wings are transparent, the margins being light yellowish. The body is mostly of an orange color, the legs yellowish.

The Gall.

The gall is a conspicuous oval-shaped swelling, in length from about 2 mm. to 2.5 mm. It is often slightly paler than the color of the leaf or stem upon which it occurs, but on some plants particularly on the stems it is concolorous and inconspicuous. When the flies have emerged the galls are readily seen, particularly on the older leaves, owing to their having turned yellowish or whitish in color.

Habits.

Food Plants. In the Ottawa greenhouse all varieties of chrysanthemums were seemingly attacked. A large number of different varieties were being grown and the kinds which were noted to have been most freely attacked are the following: Chrysolora, Naomah, Radoelii, Ramapo, Hortus Tolsoms, Mrs. Clay Frick, December Gem, Madam G. Rivol, Dr. Enguehardt, Anna, Pacific Supreme, Early Snow, Elberon, Ursula Griswold, Aesthetic and Etherington. The varieties Bob Pulling, Gertrude Peers, Daily Mail, Oconta, Mrs. G. C. Kelly, W. Wood Mason, F. T. Quilleton, and E. T. Quittington were fairly free from injury. All of the above varieties are, of course, the blended product of *Chrysanthemum indicum* and *C. morifolium,* both of which grow wild in China and Japan.

In the Victoria greenhouse these varieties were infested: Smith's Advance, Halliday, Ivory, Polepheum, Chrysolora, Bonnafon, Wm. Turner, Western King,

Mrs. Thompson, Englehart, various Pompons. Of these varieties Smith's Advance, Ivory, Bonnafon, Wm. Turner, Western King, and Englehart were practically ruined.

Felt[1] states that the insect has been recorded from central and southern Europe as infesting *Chrysanthemum leucanthemum, C. corymbosum, C. atratum, C. japonicum* and *C. myconis.* In America the pest was first noticed on the variety known as Mistletoe.

Nature of Injury. The gall (fig. 1, page 117) which is caused by the larva irritating the plant tissues occurs commonly on various portions of the chrysanthemum plants. In the Ottawa greenhouse the galls were commonly found on the leaves, stems and buds. The galls at one time were so abundant on some young plants as to entirely deform them, as a result of which development was largely stopped and no flowers borne. Many of the single-stemmed plants show conspicuous malformation of the stem resulting from early attack of the insect. In the material received from the Victoria greenhouse the galls were found freely on the stems and leaves. On some of the terminal leaves the presence of the insect in conspicuous numbers had prevented growth and the leaves were clumped together in more or less rosette fashion.

Means of Control.

In the Ottawa greenhouse some control work was conducted under the immediate direction of Mr. J. McKee. The greenhouse was fumigated during the winter of 1915-16 with hydrocyanic acid gas about once every month. Such fumigation destroyed the adults. The house was also fumigated with tobacco. The cuttings from the stools were dipped before potting (in early December) in nicotine solution in the strength of ¾ of an ounce to one gallon of water; the plants were dipped a second time when repotted from 2½-inch pots to 4-inch pots, and a third time when transferred from 4-inch pots to 6-inch pots. During July and August (1916) the chrysanthemums were sprayed with nicotine, in the same strength, every three weeks. Since the first week of September to the present date (October 16, 1916), the house has been fumigated with tobacco once every ten days.

While the midge is still present in the greenhouse, it is by no means the pest it was in 1915. The above treatment has undoubtedly kept the insect down.

In Mr. Woodward's greenhouse in Victoria, B.C., the following remedies were tested: During the first week of treatment the plants were fumigated with Black Leaf 40 every night; in the following week they were fumigated three times, and sprayed twice with Campbell's Nico Soap; during the third and fourth week the plants were fumigated twice each week and sprayed once each week. Mr. Woodward reported that as a result of this one month's treatment he had succeeded in killing many adults, and thought he was slowly getting the insect under control. The fumigation he reported was used as strong as the plants would stand without burning the foliage.

The Rose Midge, *Dasyneura rhodophaga* Coq.

In the report of the Dominion Entomologist for the year ending March 31st, 1915, a brief mention is made of the occurrence of this pest at London, Ont., specimens of the infested shoots of the variety Mrs. J. Laing having been received at Ottawa in July, 1914. This was apparently the first record of the Rose Midge in Canada. The grower reported that the buds on about 300 plants in his rose

[1]31st Report of the State Entomologist, New York, 1915, p. 51.

garden had been injured, (see fig. 4, page 117). The following summer the pest was again present in the same garden and Mr. W. A. Ross, Field Officer of the Branch, obtained infested material and reared the adults. Some of the latter were forwarded to Dr. Felt who confirmed the determination of the insect. Regarding the injury, Mr. Ross reported: "All 'Hybrid Perpetuals' and 'Hybrid Teas' are subject to attack. Mrs. John Laing is apparently the most susceptible variety. H. T's with strong terminal shoots like those of Killarney are partially immune. All the Polyantha, Bourbons, Hybrid China, Noisette and Wichuraiana roses appear to be immune."

The only other outbreak of the insect in Canada is its occurrence at the present time (autumn of 1916) in the greenhouses of Miller & Sons, Toronto. Its work was first noticed in these latter houses in September (1916). The buds of the young shoots did not develop and on investigation it was found that they were being destroyed by the larvæ. The varieties of roses which have been severely injured in the Toronto greenhouses are Ophelia, Milady and Stanley. The variety Richmond was very slightly attacked. Mr. Miller is of the opinion that the pest was introduced on rose bushes imported from Chicago, Ill.

The first record of the Rose Midge in America was in 1886[1] when it was discovered to be effecting injury to greenhouse roses in the State of New Jersey. It was not until 1900, however, that the insect was described by Coquillett as *Neocerata rhodophaga*.[2] Since 1886 the midge has been reported from New York, District of Columbia, Massachusetts and Illinois.

As the Rose Midge is one of the worst known pests of roses, florists in Canada should realize the danger of its being introduced into their houses. The Entomological Branch will gladly assist growers in any way it can, and will appreciate the receipt of injured plants and information as to suspected occurrence of this insect. It has been recorded that in a single year in two greenhouses in Chicago the Rose Midge has caused damage estimated at $10,000.

Life-history.

But few observations have as yet been made in Canada on the life-history of the insect. In the State of Illinois its life-history was studied by the late F. M. Webster, and his observations were published in 1904[3]. Davis[4] has also investigated the habits of the insect.

The perfect insect, or midge, is two-winged and is closely related to the Chrysanthemum Midge. The female deposits its yellowish eggs, which are so small as to be hardly visible to the naked eye, beneath the sepals of the flower buds or between the folded leaves of the leaf buds. The egg period is recorded as being only two days. When the young, whitish, maggots hatch they at once begin to destroy the terminal leaves and the blossom buds, and in from about five to seven days they become mature and then leave the plant, (fig. 3, page 117), dropping to the soil where they change to the pupal state. Webster has observed as many as twenty-five larvæ in a single blossom bud. Davis states that in summer the fly emerges about six days after pupation occurs. In greenhouses in Chicago the insect has been present from June until October or November in such numbers as to make it impossible to secure a single crop of flowers. During the colder winter months it is assumed that the insect is present in the pupal stage in the greenhouse soil.

[1]Insect Life, 1, 284.
[2]Bull. 22, N.S., Div. of Ent., U.S., Dept. Agr., 47.
[3]Bull. Illinois State Lab. of Nat. Hist., Vol. VII, pp. 15-25.
[4]27th Rep. State Ent., Illinois, 1912.

Means of Control.

The question of controlling the insect has been discussed chiefly by Davis,[1] who recommended two methods: (1) the growing of another crop, such as carnations, instead of roses for one year and (2) the thorough cleaning of the house in midwinter, at which time the insects are dormant in the soil, the plants to be removed and destroyed, all earth in which they have been grown and which may contain puparia to be also removed and deeply buried at some distance from the infested houses, and further that all rubbish beneath benches be also removed and the earth, floors and benches afterwards sprayed with a contact insecticide such as kerosene emulsion.

Fumigating greenhouses with hydrocyanic acid gas will, of course, destroy the flies, but such fumigation has not proved to be a practical remedy. In an infested house it is advisable to go over the plants every day, if possible, to remove the injured buds, which should afterwards be burned.

As to controlling the insect in gardens, Mr. Wood tried many methods to exterminate it but found that the only satisfactory way was to cut off all the green shoots. Such cuttings, of course, should be burned promptly.

EXPERIMENTS IN THE CONTROL OF THE POPLAR AND WILLOW BORER (*Cryptorhynchus lapathi* Linn.).

Robert Matheson, Ithaca, N.Y.

The Poplar and Willow Borer is a serious pest in nurseries of New York State and at present is doing much damage. It is also a serious pest to ornamental poplars and willows, including basket willows. The most extensive depredations of this pest occur in nurseries where large blocks of these trees are grown, and in

Cryptorhynchus lapathi. Adult.

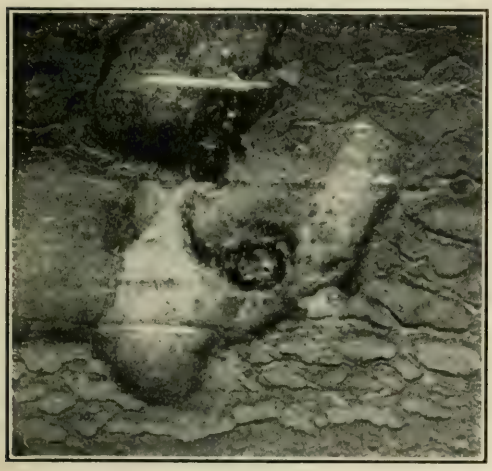
Egg puncture at side of lenticel.

some cases the annual loss is very considerable. During the past three years, as time would permit, control experiments have been conducted in two of our large nurseries. This work has been made possible through the courtesy of the proprietors, and to them I desire to express my thanks.

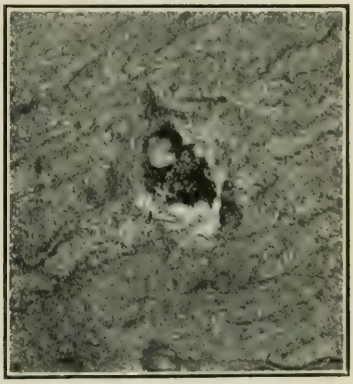
[1] 27th Rep. State Ent. Ill., 111.

Although considerable biological data have been gathered in the course of this work, only the control experiments and their results wil be discussed here. Since the publication of Schoene's work in Bulletin 286 of the New York Experiment Station, at Geneva, very little has been done in reference to this insect. As the result of his work he recommended the use of Bordeaux mixture containing an arsenical. This spray should be applied during late July in order to destroy the adults which feed indiscriminately on the bark of the trees. Owing to the difficulty of spraying nursery trees this recommendation has not been adopted, and I know of no experiments which have been conducted on a large scale in order to test the efficiency of this method.

To present the method of experimentation more clearly a brief synopsis of the life cycle of *C. lapathi* Linn. is necessary. The eggs are deposited in August, September and October in two or three-year-old stock in the nursery rows. I did not succeed in finding eggs in younger stock. The eggs are laid exclusively in the corky portions of the tree, just below the surface of the bark near the cambium



Egg in situ.



Larva, just hatched.

layer. They were found most commonly around lenticels, near buds and branches, or in growths caused by pruning. These eggs hatch in late August, September and October. The young grubs feed on the bark and grow slightly before hibernation. In these small chambers, just below the surface of the outer bark, the young larvæ pass the winter. Feeding begins early in the spring, the larvæ attacking the cambium layer and often girdling the trees. In late June they bore into the heart of the trees, forming the pupal cells. Pupation takes place during July and the adults begin emerging in late July and August. The beetles feed for a short time before beginning to oviposit.

Up to the time that the writer undertook work on this insect no efficient control measures had been devised. The general recommendations had been the cutting out and destruction of infested trees. Schoene in Bulletin 286 of the New York Experiment Station stated that the use of arsenicals during July and August would poison the greater majority of the beetles and reduce infestations in nurseries. In practice it has been found that though Paris green and lead arsenates were used in large quantities it had no effect in reducing the annual loss. At the time (1914) the author began to look into this problem several large nurseries in New York

State had about concluded to cease raising Carolina poplars although there was a steady demand for such stock.

Early observations led the writer to the conclusion that this insect could be destroyed by some contact spray applied to the trunks of the trees in the autumn after the leaves have fallen, or in the spring before the young larvæ have begun actively feeding. This seemed very reasonable, owing to the quite exposed condition of the young larvæ in their burrows. It seemed that some of the emulsions ought to penetrate the outer bark or be absorbed through the very small amount of frass at the entrance to the burrows and destroy them. With this conclusion, varying strengths of miscible oils and kerosene emulsion applied both in the fall and spring were experimented with. In order to secure a stronger penetrating fluid it was felt carbolineum avenarius ought to be given a thorough trial, but very little is known about the constituents of this preparation. Furthermore, very little is known as to its effects on actively growing or dormant trees.

In the fall of 1913 seventy-six badly infested two-year-old poplar trees were secured and planted at the insectary. On December 1, 1913, part of this block was treated with scalecide at varying strengths and also a few trees with carbolineum and its emulsion[1] as indicated in the table. This experiment was closely watched the following spring but no injury to the trees could be noted, except that the carbolineum treated trees did not seem so vigorous. However, they grew and are now (1916) large healthy trees. Examination and careful count of the burrows in all of the trees was made on June 17, 1914. The number of larvæ present per tree is shown in table I.

TABLE I. CRYPTORHYNCHUS LAPATHI, Linn.

Treatment	When Applied	No. Trees	Examined	No. Infested	Larvae per Tree (Average)	Not Infested	Percent. Infested
Scalecide 1-5*	Dec.1, 1913	10	June 17, 1914	3	2.6	7	30
Scalecide 1-8	"	10	"	4	1.25	6	40
Scalecide 1-10	"	10	"	7	2.3	3	70
Scalecide 1-12	"	10	"	8	1.9	2	80
Scalecide 1-15	"	10	"	5	2	5	50
Carbolineum 1–1	"	2	"	0	.....	2	0
Carbolineum Emulsion 1-2	"	2	"	0	.....	2	0
Check	"	22	"	10	2.6	12	45.5

In the spring of 1914 a series of experiments was undertaken in a large nursery. Three-year-old stock was chosen as it was the most available at the time of doing the work. Badly infested trees were selected at one side of a large block which had been recently dug. Directly across the roadway was a block of young poplars. On March 31 scalecide, of varying strengths, carbolineum, and carbolineum emulsion were applied to the trunks from the ground up to the young growth. The day was fair but it began raining before the various treatments were completed. However, the rainfall was slight so it should not have had any effect on the insecticidal qualities of the preparations.

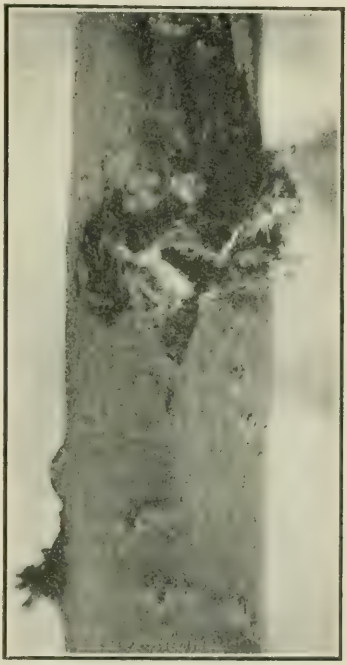
The treated trees were examined carefully on May 14, 1914. The various treatments had no effect on the growth of the trees, every tree growing vigorously,

[1]The carbolineum emulsion was prepared as follows: 1 lb. sodium carbonate, 1 quart hot water, 1 quart carbolineum avenarius. The sodium carbonate was dissolved in the hot water and the carbolineum was then added, stirring vigorously.

*All dilutions are with water.

and their being no difference as far as could be detected between the checks and those under experimentation. In the checks the larvæ were actively at work and their abundance was indicated by the amount of sawdust exuding from the numerous burrows. All the trees treated with different strengths of scalecide showed just as high a percentage of infestation as the checks. This preparation had no appreciable effect. In the trees treated with carbolineum, either pure or as an emulsion, not a trace of infestation could be found. After searching for several hours one shrivelled and blackened larva was discovered in its burrow. However, it was not desirable to injure the trees too much by cutting into all suspicious egg punctures.

The girdling work of the larvæ on nursery trees.



Showing the beginning of the formation of the pupal chamber.

This experiment was again carefully examined on June 18 and confirmed previous observations. The checks and those treated with scalecide were nearly all badly infested, many trees with as many as eight to ten borers present, while a few both in the treated and checks were apparently free. Those trees treated with carbolineum and its emulsion were growing even more vigorously than the untreated ones, and not a single trace of the work of the borer in any one of the twelve treated trees could be discovered. These preparations colored the trunks of the trees a beautiful brown, but other than that no injury could be seen.

Fearing that such a perfect control might be due to other causes than the effect of the treatment, a larger series of experiments was planned for the fall of 1914 and spring of 1915. Discarding the miscible oils, kerosene emulsion was given a trial as it has been recommended for the control of the locust borer (*Cyllene robiniæ*). In a block of over 10,000 trees ready for digging in the fall of 1915

rows were selected at the end which showed the greatest amount of the feeding work of the beetles. On December 4, 1914, groups of twenty trees were each treated with pure kerosene emulsion, carbolineum and carbolineum emulsion. Rows were left between for checks. The material was applied directly to the trunks up to the younger growth. On April 9, 1915, twenty-five trees were treated with pure kerosene emulsion, fifty with carbolineum emulsion and twenty-eight with pure carbolineum. Just previous to these treatments the trees in the whole block had

Three pupal chambers in a small 3-year old nursery tree.

Pupa in its cell.

been pruned carefully. The material was carefully brushed over the trunks, covering all the cut surfaces of the recently removed branches.

The experiment was examined on June 28. The block as a whole showed a severe infestation, sawdust being present at the base of a great many trees, and this could be seen for a long distance down the nursery rows. In the rows treated with carbolineum or its emulsion no sawdust could be seen and the trees were vigorous growers, the trunks showing a beautiful brown color but not an indication

of borer work. The kerosene emulsion had no appreciable effect, nor did it injure the trees, though it was applied in large quantities. The treatments applied and results obtained may be quickly ascertained by consulting Table II. Kerosene emulsion applied pure in the fall seems to have had some effect, but one cannot

Effects of borers on nursery stock. The tree in the centre is uninjured, and one year younger than the other two. Note the comparative size and beauty of uninjured tree.

safely draw conclusions. Thirty per cent. infestation is high, though the average number of larvæ per tree is a minimum. The carbolineum applied pure and its emulsion gave almost absolute control and seems to me a very simple and effective means of control under nursery conditions.

TABLE II. CRYPTORHYNCHUS LAPATHI, L|nn.

Treatment	When Applied	No. Trees	Examined	No. Infested	Larvæ per Tree (Average)	Not Infested	Percent. Infested
Kerosene emulsion, (pure)	Dec. 4,1914	20	June 28. 1915	6	1	14	30
" "	Apl. 9,1915	25	"	16	2.25	9	64
Carbolineum	Dec.4,1914	20	"	0	.....	20	0
" emulsion	Apl. 9,1915	27	"	0	.....	27	0
Carbolineum "	Dec. 4,1914	20	"	0	.....	20	0
" "	Apl. 9,1915	50	"	0	.....	50	0
Check	.....	116	"	56	2.4	60	48.3

The success of the preliminary experiments led to the trial of the carbolineum treatment on a commercial scale. In the fall of 1915 arrangements were made to treat two entire blocks of poplar trees in two large nurseries. This was made

One of many piles of discarded poplars in nursery.

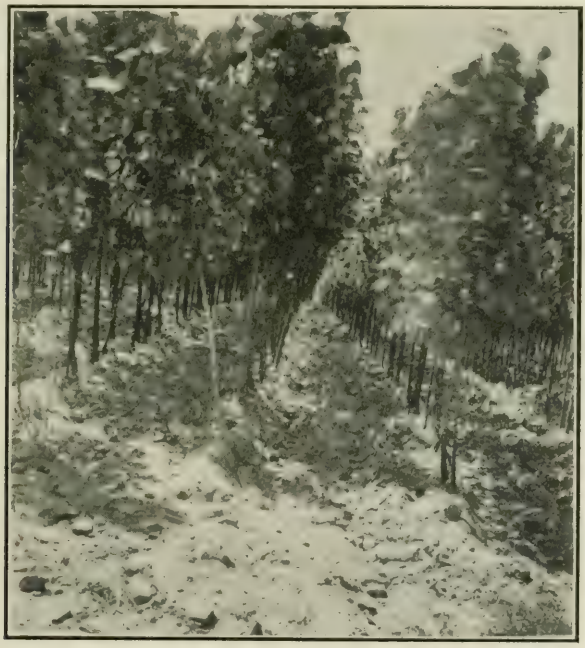
possible by the courtesy of the owners who provided all the material, help and necessary equipment, the writer taking charge of the work. Each block of trees contained approximately 14,000 trees. Owing to the excessive snowfall during the winter of 1915 and 1916 it was not possible to apply the carbolineum as early as was intended. Furthermore, it was also delayed somewhat in order that the trees should be pruned.

On April 8, 1916, 21 rows in one block were treated. As the day was cold, threatening snow and sleet, the work was discontinued. During the following day over three inches of snow fell and the remainder of the block was not treated till April 13. In the meantime the borers had begun feeding, in fact were active since about the early days of April. The results of the treatment in this block are shown in the following table:

TABLE III. CRYPTORHYNCHUS LAPATHI, Linn.

Treatment	When Applied	No. Trees	Examined	No. Infested	Larvæ per tree	Not Infested	Per cent. Infested
Carbolineum	Apl. 18, 1916	5,000	June 22, 1916	0*	0	1,161	0
	" 13, "	9,000	July 20, "	1	1	1,160	.....
Creosote.....	" 8, "	136	June 22, "	0	0	136	0
			July 20, "	0	0	136	0
Check	.....	313	June 22, "	9	2	304	2.9
			July 20, "	11	2	302	3.5

It will be seen from the above table that practically absolute control was secured with the carbolineum treatment. Unfortunately, the entire check row did not show a high percentage of infestation, but it is sufficient to indicate that the treatment was effective. In addition to the carbolineum a high grade creosote was



Showing treated row on each side of a check. Note the almost black color of the treated rows.

also tried in a limited way. The creosote also gave perfect control and this indicates well, for the row treated stood directly next the check row. The carbolineum gave the bark of the trees a beautiful brown appearance, but it in no way affected the vigor of the trees. This brownish coloration gradually becomes reduced during the summer, but treated trees can be recognized easily at least three

*In order to determine the infestation in the treated trees not all of the 14,000 trees were examined. Rows were selected, however, in different parts of the block and every tree examined carefully. In this way, 1,161 trees were closely scrutinized and not a sign of borer work could be found. Based on the result of this examination the figures in the table have been prepared. In the second examination a single larva was found at work on one of the treated trees, but as this was the *rare* exception the fact has been ignored in the percentage column.

years afterwards. Another point that should be brought out here is that the four trees treated with carbolineum in my experimental plot in 1913 (Dec. 1, 1913), were not attacked during the summers of 1914 and 1915 and only a single larva was found in them during 1916. This would indicate that carbolineum treated trees are not readily selected by the females for oviposition, provided untreated trees are available. This point will be further investigated by the writer.

The results of the treatment of the second block of about an equal number of trees are shown in the following table.

TABLE IV. CRYPTORHYNCHUS LAPATHI, Linn.

Treatment	When Applied	No. Trees	Examined	No. Infested	Larvæ per Tree	Not Infested	Per cent. Infested
						*	
Carbolineum....	Apl. 12 & 13, 1916	14,000	June 23, 1916	20	1,4	1,540	1.28
			July 20, "	20	1.4	1,540	1.28
Check	.....	84	June 23, "	8	1	76	9.5
			July 20, "	8	1	76	9.5
Check	.....	555	June 23, "	19	1.2	536	3.42
			July 20, "	19	1.2	536	3.42

In this block we have extremely interesting results showing most conclusively the effectiveness of the carbolineum treatment. The author visited this nursery and showed the owner the method of treatment, but did not further supervise the work. In treating the trees the following day the workman failed in many cases to cover the base of the trees with the material, and also failed to apply it sufficiently high on the trunk. As a result all of the infestations, amounting to nearly 1.3 per cent., occurred either at the base or above the highest point of treatment. Another interesting point is in regard to the check row. This row running through the centre of the block contained 639 trees. When the owner saw the excellent results in the treated trees he thought why should he not save most of the check row. So on June 3, 4 or 5, he did not know the exact date, he treated 555 of the trees, leaving some at either end as a true check. The treatment, even at this late date, had a marked effect as shown by the percentage of infestation as found on June 23. During the first week in June all of the larvæ were still at work in the cambium layer and wherever sufficient material was applied most of the larvæ were killed. The trees then readily outgrew the injury. The carbolineum had no apparent effect in the retardation of growth.

METHOD OF APPLICATION.

After many trials it was found that the simplest method of application was by the use of cotton waste. The carbolineum is non-injurious to the hands so each workman carried a small amount of the material in a dipper or tin can. The cotton waste was dipped into the material and then rubbed carefully up and down the trunk. It is not necessary usually to go higher than four or five feet, but great care should be exercised to see that the base of the tree is well treated and all parts of the trunk well covered. At the same time the material should not be allowed to run down to the roots. After the trees are pruned workmen can apply the material at a very rapid rate. It is preferable to make the application on a warm day as the carbolineum is then thinner and more easily put on the trees.

*Only 1,560 trees were examined, but these were selected rows and the percentage of infestation is fairly accurate.

Cost of Treatment.

It was at first thought that the cost of treatment might prevent its use under nursery conditions inasmuch as poplars are not very high priced stock. In one nursery a careful account of the entire cost of treatment was kept and is shown below.

Labor to treat 14,000 trees	$18 50
Material, carbolineum, 7 gals at 90c.	6 30
Total cost	$24 80
Total cost per tree	0.00177

It will thus be seen that the cost per tree is extremely small, not exceeding two-tenths of a cent, a practically negligible charge.

Note work of borer just where treatment with carbolineum ends. Shown by arrow.

Carbolineum treatment ends at arrow point A. Note the two borers near base of the tree.

Summary.

The poplar and willow borer is a serious pest in restricting the production of Carolina poplars in our nurseries. Many nurseries have either given up raising them or are planning to do so.

The trees attacked by this beetle include a wide variety of poplars (*Populus spp.*) and willows (*Salix spp.*). The trees are valuable both as ornamental, shade and forest trees and the depredations of this insect are sometimes serious.

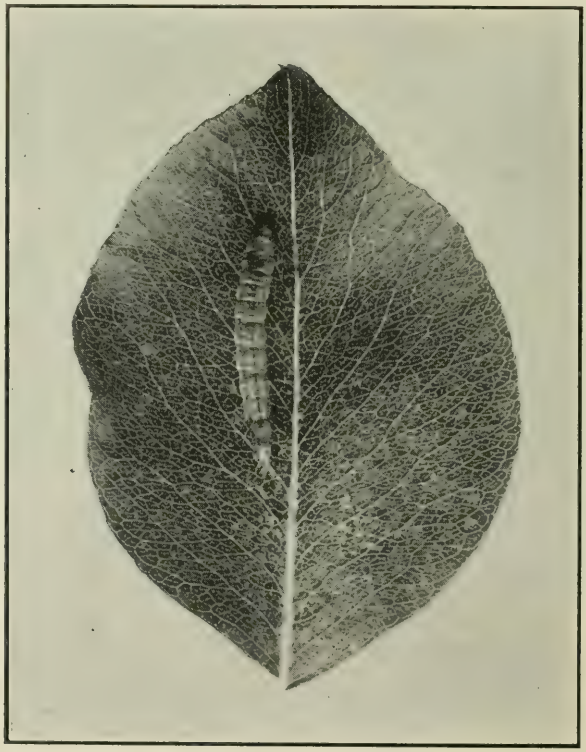
Almost perfect control was secured by treating the trunk of infested trees, under nursery conditions, with carbolineum. The material is inexpensive and easily applied.

The writer does not see any reason why this treatment could not be extended to include willows and experiments will be undertaken with this end in view. Furthermore, if persons who purchase poplars or willows will have them treated at the time of planting the spread of the insect should be greatly checked, and at the same time save the trees.

THE FRUIT-TREE LEAF-ROLLER IN NEW YORK STATE.

GLENN W. HERRICK, ITHACA, N.Y.

Because of its varied agricultural and horticultural interests, because of its nearness to the seaboard and the consequent importation and landing of many and various plants and agricultural products, and because it stands in the path of the great carriers to the Western States, New York is especially subject to outbreaks



Larva of the leaf-roller.

of both old and new insect pests and plant diseases. This is true more especially perhaps of those affecting the horticultural interests of the State. Nearly every season witnesses an outbreak of some old pest which has suddenly gained a new foothold, and has taken on new energy or of some foreign importation that has been dropped by the way or been established by the bringing in of new plants or plant products. To the entomologist New York State furnishes a field of perennial interest, but to the horticulturist one of perennial fight and struggle.

Because of the proximity of the principal fruit districts of the State to those of Ontario, Canada, whatever is of interest in the way of insect pests here is also of considerable interest to Ontario entomologists and fruit growers. It was with this thought in mind that the writer chose to discuss briefly the fruit tree leaf-roller in New York.

This leaf-roller is not an insect new to this country for it has been known since 1863 when Walker described it and since 1896, at least, it has been put among the enemies of the apple in New York. It was not, however, until 1911 that the leaf-roller began to attract particular attention in this State. It furnishes a fine example of an insect previously unimportant which has suddenly and inexplicably multiplied to an enormous degree and reached the rank of a serious pest at a single bound, for during the seasons of 1912, 1913, 1914, and 1915, it caused serious and rather widespread injury in Western New York. In addition, it became unusually abundant and injurious in Colorado and New Mexico during the same period. During the past season it was much less in evidence but no prediction can be made regarding it for it may break out again at any favorable time.

Habits and Injuries.

The larvæ appear as the buds are bursting and begin to attack the unfolding leaves. They bend the leaves over and tie them together with silk. Within this sort of nest the larvæ live and eat the leaves. As soon as the blooms

Leaves tied together by the leaf-roller.

Work of leaf-roller on pears.

appear the larvæ begin to eat off the blossom stems and tie them together with silken threads, along with the leaves surrounding the blossom cluster. This webbing and tying together of the blossom clusters is a most pernicious habit, because it interferes seriously with spraying for the Codling Moth. In one Baldwin orchard in which the larvæ were very abundant, the blossom clusters were so webbed together and covered over with silk, dried petals and leaves that it was almost impossible to get the spray mixture into the calyx cup. As soon as the young apples or pears begin to set they are tied together with silk, while the larvæ

live inside and gnaw cavities into the sides of the young fruit. Dr. Lintner reports the same habit of the larvæ and refers to some young pears that were eaten into, sent to him by P. Barry, of Rochester, in 1888. Stedman mentions the same kind of injury in Missouri and considers this the most serious form of injury committed by the insect. To give some idea of the number of larvæ present the writer counted 17 worms in nine blossom clusters; Braucher counted 21 larvæ on one twig 21 inches long, and 19 larvæ on another twig 22 inches long.

The larvæ also work on the leaves, rolling them and living within the roll. Here, effectually hidden, they feed on the tender tissues of the leaves. When disturbed they drop down out of their hiding places and remain suspended by silken threads like cankerworms. When all is quiet they climb back to their hiding places and begin their work again. Their injuries to the leaves are often very serious, especially when the larvæ are abundant. Gillette says, "I have seen small orchards entirely defoliated by this species so that not a green leaf could be seen."

Life-History.

Our observations accord with those of other workers for we find but one generation each year in New York.

The eggs are deposited in greatest numbers during the last of June and the first part of July. They are laid in small, oval, convex patches about as large as the end of a lead pencil on the bark of the smaller twigs. Here they remain until the following May or for a period of about ten months.

The hatching period extends over an interval of two or three weeks although the majority of the larvæ appear about the time the buds are bursting.

The full grown larva is about one inch in length, light green in color, with a black head, and black thoracic shield. It takes from three to four weeks for the larva to become full grown. It pupates in a flimsy web in a rolled leaf and in about twelve days the adult moths appear. These soon begin to deposit their eggs thus completing the life cycle.

Natural Enemies.

The fruit-tree leaf-roller seems to have a number of natural enemies. We bred at least four species of hymenopterous parasites from the larvæ and pupæ in our cages. Gill has recorded several species of birds feeding on the larvæ and has also found a few insects which are predaceous on the leaf-roller; notwithstanding this rather large list of enemies the leaf-roller has not been held in check but in spite of them has increased enormously at certain periods.

Methods of Control.

The leaf-roller has been one of the most difficult of lepidopterous apple pests to control. Its habit of rolling leaves, tying them together, and living within these protective coverings makes it difficult to get at. Attempts were made to control the insect by thoroughly spraying the infested trees with arsenate of lead and lime-sulphur about the time the buds were bursting, and again just before the blossoms opened, but the results were not satisfactory.

In the spring of 1911 a badly infested orchard in western New York was thoroughly sprayed, as the buds were bursting with 2 pounds of arsenate of lead

to 50 gallons of lime-sulphur solution. On May 13th just before the blossoms opened 13 Baldwin trees in this orchard were sprayed again with arsenate of lead, 2 pounds to 50 gallons of lime-sulphur and 200 gallons of the mixture were put on the 13 trees. Later, after the petals had fallen, the regular codling moth spray was given to these trees thus making three thorough poison sprays. We were much disappointed to find that the number of larvæ was not visibly lessened by these applications.

In the spring of 1912 we projected and carried out an extensive series of experiments in the control of this pest. Mixtures of paste arsenate of lead, arsenite of zinc, black-leaf-40 and soap, and powdered arsenate of lead in different combinations and proportions were tried on various blocks of badly infested trees, principally Greenings. In all, over seventeen combinations of materials were tried on different groups of trees in the orchard. Most of the applications were made before the cluster of flower buds had separated. At this time, however, a large part of the eggs had hatched and many larvæ had already worked their way down among the cluster buds and were feeding on the buds and bud stems.

The results of the whole series of experiments were really very discouraging so far as prevention of injury to the fruit was concerned. There was so little difference between the sprayed and unsprayed portions that it did not seem worth while to make a count of the fruit. The orchard produced only about two hundred and fifty barrels of apples out of a normal eight hundred barrels, and these were mostly in the tops of the trees and in portions of the orchard not so badly infested. In this connection the work of one of the better and more intelligent fruit growers in New York is of interest.

The large orchards of this fruit grower were sprayed five times and sprayed thoroughly and intelligently. The orchards were sprayed first, in the dormant condition, just before the buds burst, with lime-sulphur, 1 gallon to 6½ gallons of water with 1 pint of black-leaf-40 to every 100 gallons for the aphis. The second spraying was made just before the blossoms opened with lime-sulphur 1 to 50 and 3 pounds of arsenate of lead. The third application was made just as the petals had fallen and consisted of lime-sulphur 1 to 50, arsenate of lead 3 pounds and black-leaf-40, ¾ pint to 100 gallons. A fourth spraying was made about ten days to two weeks after the third with lime-sulphur 1 to 50 and 3 pounds of arsenate of lead. At about this time the owners became much worried over the roller and sprayed a fifth time with arsenate of lead alone, 4 pounds to 50 gallons. In spite of this extraordinary amount of careful and thorough spraying the trees and cover crop under the trees were alive with larvæ and 40 per cent. of the crop was ruined.

During the season of 1914 careful experiments were conducted again with the poison sprays in western New York but with indifferent results. To sum up, thorough spraying with arsenate of lead in heavy proportions has not proved effective in cases of severe infestation either in New York or in the western States.

In 1914 the writer and Mr. R. W. Leiby carried out an extensive series of experiments in the field at Hilton, New York. The writer had determined by laboratory experiments made in 1912 that the miscible oils were very effective in destroying the eggs. In 1913 some limited orchard experiments demonstrated the effectiveness of these oils under field conditions and in 1914 we determined to try them on a much larger scale. In these experiments we used Scalecide, Orchard Brand, and Target Brand miscible oils. Suffice it to say, without going into details, that the miscible oils gave very gratifying results. We were able to destroy from 74 to 92 per cent. of the eggs and we believe that these oils furnish

a means of control for the leaf-roller if they are intelligently and thoroughly applied. Such has also been the experience and conclusion of Gill in Colorado, Childs of Oregon, and Weldon, in Colorado and California.

Conclusions and Recommendations.

The leaf-roller is difficult to control because of its habit of hiding in the opening buds or in rolled leaves. Thorough spraying with arsenate of lead in heavy proportions has not proved effective in cases of severe infestation, either in New York or in the Western States.

Extended experiments show that the eggs of the leaf-roller are susceptible to the effect of miscible oils, which, when thoroughly applied, have destroyed from 74 to 92 per cent. of the eggs. In Colorado, New Mexico, and Oregon, where these oils have also been used extensively, even a higher proportion of the eggs have been destroyed. In experiments made during the last three years no injury has resulted from the use of miscible oils. The oils have been applied in the spring (April) at as near the active growing period of the tree as possible, but always before the buds burst. They have been used generally at the rate of 1 gallon to 15 gallons of water. Only one application should be made and that on a day when the temperature is above freezing.

In cases of severe infestation the oils should be supplemented by thorough sprayings with arsenate of lead at the rate of 6 pounds to 100 gallons of water or of lime-sulphur solution. At least one application should be made before the blossoms open, and another after the petals fall; the latter will serve also as the regular spraying for Codling Moth. In lightly infested orchards spraying with miscible oils may be omitted and reliance placed on thorough applications of arsenate of lead, at the rate of 6 pounds to 100 gallons of water or lime-sulphur solution. One or two applications should be made before the blossoms open and another after the petals fall.

Dr. Hewitt: It is always a very pleasurable duty at the conclusion of these meetings to thank our hosts, and I have much pleasure, therefore, in moving that the very hearty thanks of the Society be tendered to the President of the College and his staff for the generous hospitality which has been extended to the Society, both in providing for the meeting place for the Society and for our entertainment in the dining hall, and to the President of the Students' Council who so kindly added to the social enjoyment of the members. I think I am voicing the sentiments of all the members who are present when I say that this meeting has been extremely enjoyable from the social point of view from the fact that we have been permitted to lunch in the dining hall—which I may say we hope is a custom which will be continued in future years. It has added greatly to the convenience of the meeting, and to the opportunity of different members meeting each other, and also for the very enjoyable entertainment last night which was afforded us. May I also say how gratifying it is to the visiting members to find Dr. Bethune in such excellent health and still carrying on his work. It is a great pleasure to have him still taking an active part in the meetings, and I hope that pleasure will be continued for many years to come.

Prof. Lochhead: I should like to second that motion proposed by Dr. Hewitt. I have especially enjoyed my visit here. I have looked forward to it for some time, and it is like coming home again to come back here and meet old friends. Of course the student body is different from my time, but there are a sufficient number of familiar faces left to remind me of my old days here. I am

very much pleased also to see Dr. Bethune so hale and hearty. I hope he will have many years yet of pleasant work among his beloved insects and also among his beloved students. I have to thank, also, especially Mr. Baker and Mr. Caesar for the untiring efforts they have put forth for our welfare, and for the programme they have got together.

THE ENTOMOLOGICAL RECORD, 1916.

ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST, DEPARTMENT OF AGRICULTURE, OTTAWA.

Although the season of 1916 was disappointing, on the whole, for entomological work in general in Canada, there was accomplished, nevertheless, throughout the Dominion, much careful collecting in the various orders of insects. During the early part of the season, cool and rainy weather interfered considerably with such work, and later, in July and August, exceptionally high temperatures were recorded.

In June eastern entomologists had the pleasure of meeting Mr. J. H. Emerton, of Boston, Mass., and Dr. W. T. M. Forbes, of Worcester, Mass., both of whom visited together various districts in the Provinces of Ontario and Quebec. The former collected spiders, and the latter insects in general, but chiefly lepidoptera. Mr. C. H. Young, of the Geological Survey, collected in the district of Lillooet, B.C. Other officers of the Geological Survey, also brought back small collections from distant fields. The insects collected in the far north in the years 1913 and 1914, by Mr. Frits Johansen, while with the Southern Scientific party of the Canadian Arctic Expedition, are now in Ottawa, and are being mounted for immediate study.

It is again our pleasant duty to acknowledge the many favors we have received from specialists in the United States and elsewhere. Our special thanks are due to Dr. L. O. Howard, and his colleagues at Washington—Messrs. Crawford, Busck, Schwarz, Banks, Gahan, Knab and Dr. Dyar; Sir George Hampson, of the British Museum; Dr. J. M. Aldrich, of La Fayette, Ind.; Mr. C. W. Johnson, of Boston, Mass.; Col. Thos. L. Casey, of Washington, D.C.; Prof. H. F. Wickham, of Iowa City, Iowa; Mr. E. P. Van Duzee, of Berkeley, Cal.; Dr. Henry Skinner, of Philadelphia, Pa.; Mr. Chas. Liebeck, of Philadelphia, Pa.; Prof. H. S. Hine, of Columbus, Ohio; Mr. Chas. W. Leng, of New York, N.Y.; Dr. W. G. Dietz, of Hazleton, Pa.; Dr. F. C. Fall, of Pasadena, Cal.; Mr. M. C. Van Duzee, of Buffalo, N.Y.; Mr. C. A. Frost, of South Framingham, Mass.; Dr. E. C. Van Dyke, of Berkeley, Cal.; Mr. J. H. Emerton, of Boston, Mass.; Messrs. Barnes and McDunnough, Decatur, Ill.; Mr. F. H. Wolley-Dod, of Midnapore, Alta., and Dr. E. M. Walker, of Toronto, Ont.

LITERATURE.

Among the books memoirs, etc., which have appeared during 1916, and which are of interest to Canadian students, the following should be mentioned:

ALDRICH, J. M. Sarcophaga and Allies in North America: The Thomas Say Foundation of the Entomological Society of America; La Fayette, Indiana, U.S., date of issue Nov. 30, 1916. The Sarcophagid flies are interesting insects ranging in larval habit from scavengers to parasites of warm blooded animals. Dr.

Aldrich's study of the various species, comprising 301 pages, will be welcomed by entomologists generally. Sixteen plates at the end of the volume illustrate genital characters. Ninety-five species are described as new, five of which are from Canada, and five as new varieties, one of which is Canadian.

Barnes, W., and McDunnough, J. Check List of the Lepidoptera of North America: Decatur, Ill., price $2.00. The appearance of this new check list which has been eagerly awaited by lepidopterists, was an exceedingly welcome one. The authors have our hearty congratulations on the completion of such an arduous task. The classification of the species is considerably different from that in Dyar's catalogue, which most collectors have been using. The arrangement of the text matter is similar to that in Smith's 1903 check list, which it replaces. The new list comprises 197 pages.

Blatchley, W. S. and Leng, C. W. Rhynchophora or Weevils of North Eastern America: Nature Publishing Co., Indianapolis, Ind.; 1916, 682 pages, 150 text figures, price $4.00 unbound. Like the work of the senior author, the "Coleoptera or Beetles of Indiana," published in 1910, this work on the Rhynchophora, will prove of inestimable value to entomologists generally. With this new manual in hand, students will now be able to arrange, classify and determine the scientific names of the weevils in their collections. Keys to the families, sub-families, tribes, genera and species have been made an important part of the present work. Following the descriptions of each species are notes on distribution, food habits, etc. The classification used is mainly that of LeConte & Horn (1876) modified where necessary by the recent studies of Casey, Hopkins, Pierce and certain European authors. A bibliography at the end notes the various works on Rhynchophora, which have been consulted in the preparation of the volume.

Casey, Thos. L. Memoirs on the Coleoptera, VII; issued Nov. 29, 1916; The New Era Printing Co., Lancaster, Pa. This contribution of 300 pages is divided into two parts, namely: I—Further Studies in the Cicindelidæ, and II—Some Random Studies Among the Clavicornia. In the former pages 1 to 35, eleven new species are described, one of which is from Hudson Bay Territory, and thirty-three new sub-species none of which are from Canada. In part II, a large number of new species are described, only three of which, however, are from Canada.

Felt, E. P. A Study of Gall Midges, III: New York State Museum Bulletin No. 180, pp. 127-288, issued Jan. 1, 1916. In this important contribution the species of the tribes Porricondylariæ and Oligotrophiariæ are discussed, several of which are described as new. Descriptions of nine species known to occur in Canada are given. In addition to 101 text figures, 16 plates accompany the memoir, showing gall midge wings, genitalia and galls.

In the 31st Report of the State Entomologist of New York, (June 1, 1916), the same author contributes: "A Study of Gall Midges, IV, pp. 101-172, the Tribe Asphondyliariæ being monographed. Thirty-nine text figures are included.

Ferris, G. F. A catalogue and host list of the Anoplura: Proc. Cal. Acad. Sci. Vol. VI, No. 6, pp. 129-213, May 12, 1916. This publication will doubtless be a welcome one to those interested in the sucking lice. Following a key to the families, sub-families and genera, the species are listed with the names of the animals upon which they have been found. Before listing the recognized species in each genus, the author describes the important generic characters. The catalogue is complete to April, 1916.

Metcalf, C. L. Syrphidæ of Maine: Maine Agric. Exp. Station, Bull. No.

253, pp. 193-264, 9 plates, issued Oct. 14, 1916. This bulletin will undoubtedly prove of much value to Canadian dipterists, particularly those residing in the eastern provinces. Not only are descriptions of the more important or interesting Maine species given, but artificial keys to the larvæ and pupæ of the syrphidæ are also presented. Interesting chapters on the habits, structure and economic importance of the larvæ, etc., are included. The plates illustrate the life-stages of ten different species.

Mosher, Edna. A classification of the Lepidoptera based on characters of the pupa: Bull, of the Ill. State Lab. of Nat. History, Vol. XII, Article II, March, 1916, pp. 17-159, plates XIX to XXVII. In 1895, Packard published a paper entitled "Attempt at a New Classification of the Lepidoptera," based upon pupal characters. The determinations of the homology of the various parts of the pupæ were, it is stated by the above author, far from correct, and this, of course, invalidated many of his conclusions. Since Packard's paper, nothing has appeared in America towards such a classification until Dr. Mosher's contribution. Following the introduction are chapters on "Changes Preceding Pupation," and "External Morphology," under which is discussed in detail the head, the thorax and the abdomen. In the "classification" keys to many of the families are given, and plates XIX to XXVII illustrate valuable characters. The memoir is, indeed, an important one, and the author is to be congratulated on the completion of so useful a study.

Needham, James G. and Lloyd, J. T. The Life of Inland Waters, an elementary text book of fresh-water biology for American students: The Comstock Publishing Co., Ithaca, N.Y., 1916; 438 pages, 244 text figures; price $3.00. This book is divided into seven chapters: I, Introduction; II, The Nature of Aquatic Environment; III, Types of Aquatic Environment; IV, Aquatic Organisms; V, Adjustment to Conditions of Aquatic Life; VI, Aquatic Societies: VII, Inland Water Culture. Chapters IV, V and VI, contains much entomological matter.

Osborn, Herbert. Agricultural Entomology, for students, farmers, fruit-growers and gardeners: Lea & Febiger, Philadelphia and New York, 1916; 347 pages, 252 text figures, 1 colored plate. This book, the author states, has been designed to meet the needs of students and others who wish to learn something of insect life, especially in relation to farm crops and live stock. It will undoubtedly prove a useful work of reference.

Osborn, Herbert and Drake, Carl J. The Tingitoidea of Ohio: Ohio State University Bulletin, Vol. XX, No. 35, pp. 217-251. This study of these insects of Ohio commonly known as "lace-bugs" will be of interest to Canadian students. Ten new species are described. Nine figures occur in the text in addition to which there are two plates.

Van Duzee, Edward P. Check List of the Hemiptera (excepting the Aphididæ, Aleurodidæ and Coccidæ of America, north of Mexico, p. 111: New York Entomological Society, 1916. The appearance of this long-looked for check list was, I feel sure, welcomed by entomologists generally. In the preface the author states that "the present Check List has been drawn off from a complete bibliographical and synonymical catalogue of the Hemiptera of America North of Mexico, which was completed last winter, and later will be published by the University of California Press. Except for the references to the literature of the subjects, this Check List gives most of the information in the large catalogue and includes the systematic arrangements, full synonymy, the date of each name, and roughly the distribution of each species." Copies of the Check List may be obtained

from the Treasurer of the New York Entomological Society, the price of the same is $1.50.

Van Duzee, E. P. Monograph of the North American Species of Orthotylus (Hemiptera): Proc. Cal. Acad. Sci., Vol. VI, No. 5, pp. 87-128, May 8, 1916. In this paper the author includes the species recorded from America, north of Mexico. Twenty-five species are described as new, one of which is from Canada. One plate showing male genital hooks accompanies the paper.

Collectors.

The following is a list of the names and addresses of collectors heard from during 1916:

Anderson, E. M., Provincial Museum, Victoria, B.C.
Baird, Thos., High River, Alta.
Beaulieu, G., Ent. Branch, Dept. Agr., Ottawa.
Beaulne, J. I., Ent. Branch, Dept. Agr. Ottawa.
Bethune, Rev. Prof., O.A.C., Guelph.
Blackmore, E. H., Victoria, B.C.
Bowman, K., 9914-115th Street, Edmonton, Alta.
Brimley, J. F., Wellington, Ont.
Brittain, W., Agric. College, Truro, N.S.
Caesar, L., O.A.C., Guelph, Ont.
Carr, F. S., Edmonton, Alta.
Chagnon, Gus., Box 521, Montreal.
Chagnon, W., St. John's, Que.
Chrystal, R. N., Ent. Branch, Dept. Agr., Ottawa.
Cockle, J. W., Kaslo, B.C.
Cosens, Dr. A., Parkdale Collegiate Institute, Toronto.
Crew, R. J., 561 Carlaw Ave., Toronto.
Criddle, Evelyn, Aweme, Man.
Criddle, Norman, Aweme, Man.
Dawson, Horace, Hymers, Ont.
Day, G. O., Duncan, B.C.
Dod, F. H. Wolley-, Midnapore, Alta.
Dunlop, James, Woodstock, Ont.
Emile, Rev. Bro., Longueuil, Que.
Evans, J. D., Trenton, Ont.
Fyles, Rev. Dr. T. W. 268 Frank St., Ottawa.
Germain, Rev. Bro., Three Rivers, Que.
Gibson, Arthur, Ent. Branch, Dept. Agric., Ottawa.
Hadwen, Dr. S., Agassiz, B.C.
Hahn, Paul, 433 Indian Road, Toronto.
Hanham, A. W., Duncan, B.C.
Harrington, W. H. 295 Gilmour St., Ottawa.
Hewitt, Dr. C. Gordon, Ent. Branch, Dept. Agric., Ottawa.
Holmes, James G., Westmount, Que.
Hudson, A. F., Millarville, Alta.
Johnson, Geo. S., Moose Jaw, Sask.
Kitto, V., Inland Revenue, Dept. Interior, Ottawa.
Leavitt, A. G., St. John, N.B.
Macnamara Chas., Arnprior, Ont.

Mackie, Donald, Edmonton, Alta.
McIntosh, W., St. John, N.B.
Mignault, Rev. J. B., Saint Lambert, Que.
Moore, G. A., 359 Querbes Ave., Outremont, Montreal.
Payne, H. G., Granville Ferry, N.S.
Perrin, Jos., McNab's Island, Halifax, N.S.
Petch, C. E., Hemmingford, Que.
Phair, A. W. H., Lillooet, B.C.
Ruhmann, Max M., Vernon, B.C.
Roberts, H. L., Winnipeg, Man..
Ross, W. A,. Vineland Station, Ont.
Roy, Henri, Quebec, Que.
Sanders, G. E., Annapolis, N.S.
Sanson, N. B., Banff, Alta.
Simpson, W., Dominion Observatory, Ottawa.
Simms, H. M., 192 Ontario East, Montreal.
Sladen, F. W. L., Experimental Farm, Ottawa.
Strickland, E. H., Experimental Station, Lethbridge. Alta.
Swaine, J. M., Ent. Branch, Dept. Agric., Ottawa.
Tams, W. H. T., Midnapore, Alta.
Taverner, P. A., Victoria Memorial Museum, Ottawa.
Tothill, J. D., Fredericton, N.B.
Treherne, R. C., Agassiz, B.C.
Venables, E. P., Vernon, B.C.
Walker, Dr. E. M., Univ. of Toronto, Toronto.
Wallis, J. B., 265 Langside St., Winnipeg, Man.
Whitehouse F. C., Red Deer, Alta.
Willing, Prof. T. N., Univ, of Saskatchewan, Saskatoon, Sask.
Wilson, Tom, 1105 Broadway, Vancouver, B.C.
Winn, A. F., 32 Springfield Ave., Westmount, Que.
Young, C. H., Victoria Memorial Museum, Ottawa.

NOTES OF CAPTURES.

(Species preceded by an asterisk (*) described during 1916.)

LEPIDOPTERA.

(Arranged according to Barnes & McDunnough's Check List of the Lepidoptera of North America.)

Papilionidæ.

5. *Papilio bairdi* Edw. Red Deer, Alta., June 24, 1916, (Whitehouse).

Satyridæ.

120. *Oeneis macouni* Edw. Victoria Beach, Man., July 1, 1916, (Duthie).

Nymphalidæ.

189. **Brenthis aphirape dawsoni* B. & McD. Hymers, Ont., June 15-30, (Dawson); Can. Ent., XLVIII, 222.

193. **Brenthis chariclea grandis* B. & McD. Hymers, Ont., Aug. 1-15, (Dawson); Can. Ent., XLVIII, 222.
202. *Brenthis astarte* D. & H. Lillooet, B.C., (Phair).
305. **Basilarchia arthemis rubrofasciata* B. & McD. Province of Saskatchewan, (Croker); Cartwright, Man.; Calgary, (Dod); Can. Ent., XLVIII, 221.

Hesperiidæ.

Andopea (*Pamphila*) *lineola.* Mr. W. E. Saunders, of London, Ont., has informed me that this European species has been found at London, Ont., as follows: July 21, 1910, (10 specimens taken), 1911, (2 specimens taken). Since, taken every year, the name of the collector being Mr. John A. Morden. The determination, Mr. Saunders tells me, was made at Washington.

Sphingidæ.

696. *Sphinx drupiferarum* A. & S. Red Deer, Alta., June 28, 1916, (Whitehouse).
733. *Hæmorrhagia gracilis* G. & R. Petawawa, Ont., June 10, 1910, (record sent by A. F. Winn from specimen in collection of G. A. Southee, Outremont, Que.).

Saturniidæ.

785. **Hemileuca lucina latifascia* B. & McD. Aweme, Man., Sept., (N. Criddle); Can. Ent., XLVIII, 224.

Arctiidæ.

973. *Apantesis parthenice* Kirby. Stellarton, N.S., (C. B. Hills). First record I have for the Province, (A. G.).
982. *Apantesis virguncula* Kirby. Stellarton, N.S., (C. B. Hills). First record I have for the Province, (A. G.).
989. *Apantesis phyllira* Dru. Wellington, Ont., July, (record sent by J. D. Evans). Furthest eastern record for Ontario, (A. G.).
1033. *Haploa lecontei militaris* Harr. Stellarton, N.S., July (C. B. Hills). First record we have for the Province, (A. G.).
1034. *Haploa confusa* Lyman. Stellarton, N.S., July 19, (C. B. Hills). First record we have for the Province, (A. G.).

Noctuidæ.

1214. **Copablepharon viridisparsa* Dod. Lethbridge, Alta., July 20, 1915, (Strickland); Calgary, Alta., Aug. 7, 1902, (Willing); Can. Ent., XLVIII, 60. The species is the No. 385 of Dod's Alberta list, originally recorded as *absidum.*
1379. **Euxoa thanatologia perfida* Dod. Calgary, Alta., (Dod): High River, Alta., (Baird); Miniota, Man., (Dennis); Kaslo, B.C., (Cockle). Can. Ent., XLVIII, 64. This is the moth referred to under No. 224, in Dod's Alberta list.
1409. *Feltia volubilis* Harv. Duncan, B.C., June 3, 1916. New to local list, (Hanham).
1718. *Polia goodelli* Grt. Murray Bay, Que., (Holmes). Only one locality—St. Hilaire—in Winn's list of Quebec lepidoptera.

1887. *Xylomiges dolosa* Grt. Edmonton, Alta., April 17, 1915; April 27, 1916, (Mackie). New to Alberta, (Dod).

2001. **Cucullia omissa* Dod. Head of Pine Creek, near Calgary, Alta., May 18, June 25-Aug. 13, (Dod); Windermere, B.C., June 12, 1907, (Dod); Nelson, B.C., (H. Cane); Aweme, Man., June 6-14, (N. Criddle); Cartwright, Man., (Heath); Hymers, Ont., July 11, 1912, (Dawson); Can. Ent., XLVIII, 58.

2116. *Epidemas melanographa* Hamp. Quamachan Lake, B.C., Oct. 10, 1910; Victoria, B.C., end of Aug., 1916, (Hanham).

2264. *Septis plutonia* Grt. Edmonton, Alta., July, 1915 and 1916, (Mackie). New to Alberta list, (Dod).

2295. *Trachea adnixa* Grt. Duncan, B.C., July, (Hanham).

2390. *Callopistria floridensis* Gn. This insect, the caterpillar of which has appeared in greenhouses in destructive numbers at Weston, near Toronto, Ont., and Montreal West, Que., is a new addition to the Canadian list. Moths from the former locality have been reared at Ottawa, (Gibson).

2440. *Acronycta fragilis* Gn. Edmonton, Alta., May 20-June 23, 1915, (Mackie). New to Alberta list, (Dod).

2441. *Acronycta minella* Dyar. Starblanket, Sask., (H. Hutchinson).

2476. *Acronycta felina cyanescens* Hamp. Victoria, B.C., July 10, 1916, (Hanham).

2497. *Acronycta distans dolorosa* Dyar. Quamichan Lake, B.C., July 29, 1914, (Hanham).

2508. *Acronycta oblinita* A. & S. Edmonton, Alta., April 30-June 15, 1914, (Mackie). New to Alberta list, (Dod).

2528. *Andropolia maxima* Dyar. Victoria, B.C., July, (Hanham).

2613. *Menopsimus caducus* Dyar. Ottawa, Ont., July 13, 1905, (Young).

2651. *Gortyna perobliqua* Hamp. Edmonton, Alta., Aug. 22, 1913, (Mackie). New to Alberta list, (Dod).

2695. *Papaipema frigida* Sm. Edmonton, Alta., Aug. 31, 1915, Sept. 3, 1916, (Mackie). New to Alberta list, (Dod).

3069. *Catocala semirelicta* Grt. Murray Bay, Que., (Holmes). In Winn's list of Quebec lepidoptera, Montreal is the only locality mentioned.

3211. *Panthea furcilla* Pack. Stellarton, N.S., (C. B. Hills). First record we have for the Province, (A. G.). Murray Bay, Que., (Holmes). Previously recorded from Gaspe and Levis in Quebec Province.

3280. *Eosphoropteryx thyatyroides* Gn. Edmonton, Alta., July 23, 1912, Aug. 12, 1916, (Mackie). New to Alberta list, (Dod).

3398. *Calpe canadensis* Beth. Stellarton, N.S., (C. B. Hills). First record we have for the Province, (A. G.).

Notodontidæ.

3611. *Odontosia elegans* Stkr. Edmonton, Alta., July 5, 1916, (Bowman).

Drepanidæ.

3761. *Drepana bilineata* Pack. Edmonton, Alta., May 12, 1915, (Mackie). New to Alberta list, (Dod).

Geometridæ.

3981. *Lygris destinata triangulata* Pack. Edmonton, Alta., July 30-Aug. 10, 1914, also 1915, 1916, (Mackie). New to Alberta list, (Dod).

3990. *Thera otisi* Dyar. Mount Brenton, B.C., (elev. 3,500 ft.)., flying over the snow, July, 1916, (Hanham).

4018. **Hydriomena californiata niveifascia* Swett. Goldstream, B.C., April 19, 1908; Victoria, B.C., June 6, 1908, (Blackmore). Can. Ent., XLVIII, 249.

4042. **Xanthorhoe defensaria gigantaria* Swett. Cowichan Bay., April 26, 1906; Victoria, B.C., April 21-May 20, 1914, 1915, (Blackmore); Duncan, B.C., April 22, 1914, (Blackmore); Can. Ent., XLVIII, 353.

4042. **Xanthorhoe defensaria thanataria* Swett. Victoria, B.C., Aug. 26 to Sept. 25, 1913, 1914, Aug. 1, 1915, (Blackmore); Can. Ent., XLVIII, 352. This is placed in the synonymy by Messrs. Barnes and McDunnough.

4042. **Xanthorhoe defensaria suppuraria* Swett. Victoria, B.C., June 2, 1914, April 25, May 2, 1915, (Blackmore); Can. Ent., XLVIII, 354. Placed in the synonymy by Messrs. Barnes and McDunnough.

4042. **Xanthorhoe defensaria conciliaria* Swett. Victoria, B.C., Sept. 18, 1913, May 14 to Aug. 26, 1914 and 1915, (Blackmore). Can. Ent., XLVIII, 352.

4072. *Euphyia intermediata* Gn. Edmonton, Alta., May 18-June 1, 1914, also 1915, 1916, (Mackie). Mr. Dod informed Mr. Mackie that in his collection *M. lacustrata* had been labelled *intermediata,* but that he now had the real *intermediata* according to Barnes and McDunnough.

4115-1. **Nomenia obsoleta* Swett. Goldstream, B.C., April 19, 1908, (R. V. Harvey); Victoria, B.C., April 19, 26, 1908, (R. V. Harvey); Can. Ent., XLVIII, 249.

4148. *Eupithecia obumbrata* Tayl. Mt. Tzuhalem, B.C., May, (Day).

4362. *Phasiane muscariata* Gn. Genoa Bay, April 24, (Hanham).

4372. *Phasiane neptaria* Gn. Mount Sicker, B.C., (elev. 2,500 ft.), July 1, (Hanham).

4405-1. **Diastictis andersoni* Swett. Atlin, B.C., July 13, 1914, (Anderson); Can. Ent., XLVIII, 251.

4470. *Caripeta æqualiaria* Grt. Cowichan Bay, B.C., Aug., (Day).

4670. *Plagodis approximaria* Dyar. Edmonton, Alta., May 22, 1915. New to Alberta list, (Dod).

4689. *Gonodontis duaria* Gn. Edmonton, Alta., May 12-31, 1913; also 1914, 1915, 1916, (Mackie). New to Alberta list, (Dod).

Pyralidæ.

5225. *Geshna primordialis* Dyar. Hull, Que., June 23, 1916, (W. T. M. Forbes).

5446. *Dicymolomia metalliferalis* Pack. Victoria, B.C., early July, 1916, (Hanham).

Aegeriidæ.

6755. *Paranthrene asilipennis* Bdv. Hamilton, Ont., May 30, 1916. Record sent by Prof. C. J. S. Bethune.

Eucosmidæ.

6778. *Evetria albicapitana* Busck. St. Williams, Ont., on jack pine branches, (Caesar).

Tortricidæ.

7399. *Eulia juglandana* Fern. Grimsby, Ont., (Caesar).

7407-1. **Tortrix oleraceana* Gibson. Larvæ on cabbage, St. John's, Nfd., (A. J. Bayly); moths emerged, Ottawa, Aug. 9-17, (Gibson); Can. Ent., XLVIII, 374.

Plutellidæ.

7656. *Harpipteryx canariella* Wlshm. Aweme, Man., July 25, 1914, (N. Criddle).

Yponomeutidæ.

7721. *Xyrosaria celastrusella* Kearf. Aweme, Man., Sept. 13, 1912, reared from seed of *Parnassia palustrus,* (N. Criddle).

Lyonetiidæ.

8106. *Lyonetia candida* Braun. The author of this species informed me that she observed the mines of *candida* at Field and Glacier, B.C., in 1915, on the white Rhododendron, *R. albiflorum.* The species was described from material reared in California and Washington States, (Gibson).

8153. **Bucculatrix crescentella* Braun. "Toronto, Canada"; Can. Ent., XLVIII, 140.

Micropterygidæ.

8481. *Epimartyria auricrinella* Wlshm. Sherbrooke, Que., Megantic, Que., (W. T. M. Forbes); Mer Bleue, near Ottawa, (Young). New to Quebec list.

Coleoptera.

(Arranged according to Henshaw's list of Coleoptera of America, North of Mexico.)

(Henshaw's number.)

Cicindelidæ.

30. *Cicindela hyperborea* Lec. In the collections of the Dominion Entomological Branch, there is a specimen of this rare species labelled "Sask., Canada."

35. *Cicindela hirticollis* Say. East shore of Lake Winnipeg, Man., on white sand. Years ago Mr. N. Criddle took one specimen near Aweme. It has not been taken since in Manitoba until June 17, 1916, (Wallis).

* *Cicindela hudsonica* Csy. "Hudson Bay Territory"; Memoirs on the Coleoptera VII, p. 29; issued Nov. 29, 1916.

Carabidæ.

87. *Cychrus viduus* Dej. Toronto, Ont., (C. A. Good).

122. *Carabus limbatus* Say.

123. *Carabus vinctus* Web.

Both of these species were recorded in the *Entomological Record* for 1911, from Edmonton, Alta. On further investigation it is believed that both determinations were wrong. These records, therefore, should be removed from the 1911 *Record.* (A.G.)

129. *Calosoma frigidum* Kirby. Edmonton, Alta., June 5, 1915, (Carr).
145. *Calosoma moniliatum* Lec. Millarville, Alta., May, (Tams).
150. *Elaphrus clairvillei* Kirby. Edmonton, Alta., May 22, 1915, (Carr).
163. *Blethisa julii* Lec. Millarville, Alta., June, (Tams).
(9247) *Notiophilus aquaticus* Linn. Edmonton, Alta., May 6, 1916, (Carr).
205. *Pelophila rudis* Lec. Edmonton, Alta., Oct. 11, 1915, June 20, 1916, (Carr).
300. *Nomius pygæus* Dej. Dr. C. J. S. Bethune has forwarded records of this ill-smelling beetle from Bancroft, Ont., Aug. 20, and Royal Muskoka, Ont., Aug. 24, 1916. At Ottawa we also received the species from Gravenhurst, Aug. 1, 1916, (J. A. Cockburn).
321. *Bembidium concolor* Kirby. Aweme, Man., June 13, 1909, (S. Criddle).
352. *Bembidium ustulatum* Linn. Millarville, Alta., March, 1914, (N. Criddle).
364. *Bembidium dyschirinum* Lec. Mt. Lehman, B.C., May, 1910, (Hadwen).
389. *Bembidium nigripes* Kirby. Edmonton, Alta., April 12, 1915, (Carr).
Bembidium consanguineum Hayward. Edmonton, Alta., June 29, 1916, (Carr).
403. *Bembidium scudderi* Lec. Regina, Sask., May 1, 1912, (N. Criddle); Aweme, Man., June 18, 1909, (N. Criddle). New to Manitoba.
423. *Bembidium iridescens* Lec. Mt. Lehman, B.C., April, 1910, (Hadwen).
449. *Tachys nanus* Gyll. Edmonton, Alta., May 3, 1915, (Carr).
519. *Pterostichus adoxus* Say. Kentville, N.S. (Record sent by W. H. Brittain).
562. *Pterostichus cyaneus* Lec. Aweme, Man., June 6, 1910, (E. Criddle). New to Manitoba.
567. *Pterostichus convexicollis* Say. Aweme, Man., May 14, 1914, (T. and N. Criddle).
678. *Amara remotestriata* Dej. Calgary, Alta., April 27, 1912, (N. Criddle).
Amara coelebs Hayward. Aweme, Man., March 28, 1908, April 18, 1909, (N. Criddle); Winnipeg, Man., April, May, (Wallis).
770. *Platynus reflexus* Lec. Smith's Cove, N.S. (Record sent by W. H. Brittain).
776. *Platynus piceolus* Lec. Winnipeg, Man., May 3, 1911, (Wallis).
796. *Platynus corvus* Lec. Aweme, Man., April 5, June 18, 1910, (E. & N. Criddle). New to Manitoba.
830. *Platynus picicornis* Lec. Selkirk, Man., May 24, 1911; Husavick, Man., June 22, 1912, (Wallis).
836. *Platynus nigriceps* Lec. Edmonton, Alta., Oct. 11, 1915, (Carr).
853. *Galerita bicolor* Drury. Guelph, Ont., (C. A. Good).
881. *Lebia marginalis* Dej. Aweme, Man., May 6, Oct. 4, (E. and N. Criddle). New to Manitoba.
893. *Lebia fuscata* Dej. Husavick, Man., July 7, 1915, (Roberts).
978. *Brachynus cordicollis* Dej. Aweme, Man., Aug. 20, 1910, (E. Criddle). New to Manitoba.
1030. *Chlænius alternatus* Horn. Husavick, Man., Aug. 1, 1914, (Wallis).
1031. *Chlænius purpuricollis* Rand. Aweme, Man., April 20, 1905, (N. Criddle).
1125. *Selenophorus pedicularius* Dej. Aweme, Man., May 31, 1910, (N. Criddle). New to Manitoba.
1156. *Bradycellus neglectus* Lec. Winnipeg, Man., May 5, 1909, (Wallis).
1433. *Agabus anthracinus* Mann. Edmonton, Alta., June 7, 1915, (Carr).

1446. *Agabus erichsoni* G. & H. Edmonton, Alta., Sept. 5, 1915, (Carr).
1450. *Agabus clavatus* Lec. Edmonton, Alta., April 8, 9, 10, 1916, (Carr).

Hydrophilidæ.

1550. *Helophorus lineatus* Say. Edmonton, Alta., April 29, 1914, (Carr).
1653. *Hydrobius fuscipes* Linn. Edmonton, Alta., April 29, 1916, (Carr).

Silphidæ.

1695. *Necrophorus americanus* Oliv. Truro, N.S., (record sent by W. H. Brittain); Granville Ferry, N.S., (Payne).
1696. *Necrophorus sayi* Lap. Leduc, Alta., April 25, 1914, (Carr).
1813. *Clambus puberulus* Lec. Miami, Man., June 29, 1914, (Wallis).

Staphylinidæ.

* *Baryodma ontarionis* Casey. Ottawa, Ont., (Gibson); Coaticook, Que., (Beaulne); Can. Ent., XLVIII, 71.
2125. *Staphylinus pleuralis* Lec. Edmonton, Alta., April 10, 1915, (Carr).
2136. *Staphylinus fossator* Grav. Smith's Cove, N.S., (record sent by W. H. Brittain).
Pæderus nevadensis. Edmonton, Alta., Oct. 11, 1915, (Carr).
2911. *Micropeplus tesserula* Curt. Winnipeg, Man., May 3, 1912, (Wallis).

Phalacridæ.

3000. *Olibrus semistriatus* Lec. Treesbank, Man., July 21, 1910, (Wallis).
* *Olibrus tristus* Csy. "British Columbia"; Memoirs on the Coleoptera, VII, p. 52; issued Nov. 29, 1916.

Coccinellidæ.

3052. *Hippodamia falcigera* Cr. Edmonton, Alta., June 26, Oct. 14, 1916, (Carr).
3060. *Coccinella monticola* Muls. Treesbank, Man., July 14, 1915, (Wallis).
3062. *Coccinella tricuspis* Kirby. Edmonton, Alta., May 26, 1916, (Carr); Truro, N.S., (Record sent by W. H. Brittain).
3066. *Adalia frigida* var. *disjuncta* Rand. Edmonton, Alta., May 3, 1915, (Carr).
Cleis hudsonica Casey. Edmonton, Alta., May 18, 1916, (Carr).
3072. *Anisocalvia* (*Harmonia*) *12-maculata* Gebl. Edmonton, Alta., June 10, 1911, (Carr).
3073. *Mysia pullata* Say. Edmonton, Alta., May 10, 1915, (Carr).
3101. *Hyperaspis fimbriolata* Melsh. Three Rivers, Que., May, 1916, (Germain).
3115. *Hyperaspis pratensis* Lec. Winnipeg, Man., June 27, 1915, (Wallis).
3138. *Scymnus americanus* Muls. Husavick, Man., Aug. 2, 1914, (Wallis).
3152. *Scymnus puncticollis* Lec. Husavick, Man., July 5, 1915, (Roberts).

Colydiidæ.

3248. *Synchita fuliginosa* Melsh. Miami, Man., July 2, 1914, (Wallis).

Cucujidæ.

3314. *Pediacus fuscus* Er. Miami, Man., June 29, 1914, (Wallis).
3320. *Læmophlæus biguttatus* Say. Aweme, Man., June 25, 1915, in elm and ash bark, (N. Criddle).
3327. *Læmophlæus adustus* Lec. Winnipeg, Man., June 1, 1912, (Wallis).
3341. *Læmophlæus truncatus* Casey. Montreal, Que., found in flour, Feb., 1916, (Gibson).
3348. *Dendrophagus glaber* Lec. Edmonton, Alta., May 12, 1916, (Carr).

Cryptophagidæ.

3355. *Telmatophilus americanus* Lec. Miami, Man., June 26, 1914, (Wallis).
3363. *Henoticus serratus* Gyll. Winnipeg, Man., May 17, 1911, (Wallis).
Atomaria linearis Steph. Winnipeg, Man., May 17, 1911, (Wallis).
3388. *Atomaria ochracea* Zimm. Winnipeg, Man., May 15, 1909, (Wallis).

Dermestidæ.

3418. *Dermestes marmoratus* Say. Aweme, Man., May 13, 1916, (N. Criddle). New to Manitoba.
* *Attagenus canadensis* Csy. "Canada, (Ottawa and Quebec)"; Memoirs on the Coleoptera, VII, p. 183; issued Nov. 29, 1916.

Histeridæ.

3495. *Hister furtivus* Lec. Edmonton, Alta., May 8, 1915, (Carr); Midnapore, Alta., (Tams).
3523. *Hister æquus* Lec. Husavick, Man., July 13, 1915, (Roberts).
3564. *Paromalus bistriatus* Er. Edmonton, Alta., July 12, 1916, (Carr).

Nitidulidæ.

3681. *Carpophilus brachypterus* Say. Winnipeg, Man., May 19, 1915, (Roberts).
3709. *Epuræa truncatella* Mann. Winnipeg, Man., April 14, 1915, (Wallis); Edmonton, Alta., Sept. 30, 1915, (Carr).
3711. *Epuræa ovata* Horn. Winnipeg, Man., June 6, 1912, (Wallis).
3759. *Ips vittatus* Say. Edmonton, Alta., Sept. 22, 1915, (Carr).
3767. *Rhizophagus dimidiatus* Mann. Edmonton, Alta., Aug. 27, 1914, (Carr).

Latridiidæ.

3781. *Latridius minutus* L. Winnipeg, Man., April 21, 1914, (Wallis).
Melanopthalma gibbosa Herbst. Winnipeg, Man., May 13, 1911, (Wallis).
Melanopthalma distinguenda Com. Peachland, B.C., July 16, 1912, (Wallis).
Corticaria pubescens Gyll. Winnipeg, Man., March 30, 1916, (Wallis).
3799. *Corticaria dentigera* Lec. Winnipeg, Man., May 13, 1911, (Wallis).
3804. *Corticaria ferruginea* Gyll. Miami, Man., June 30, 1914; recorded from Hudson Bay by Hamilton, (Wallis).
3805. *Corticaria serrata* Payk. Winnipeg, Man., March 17, 1915, (Wallis).
Corticaria varicolor Fall. Winnipeg, Man., April 17, 1911, (Wallis).
3810. *Melanophthalma americana* Mann. Winnipeg, Man., April 17, 1911, (Wallis).
3826. *Melanopthalma picta* Lec. Winnipeg, Man., May 13, 1911, (Wallis).

Trogositidæ.

3833. *Trogosita chloroida* Mann. Vernon, B.C., (Brittain).
3851. *Grynocharis 4-lineata* Melsh. Winnipeg, Man., May 14, 1915, (Roberts).
* *Ostoma nigrina* Csy. "British Columbia (Aldermere) Keen"; Memoirs on the Coleoptera, VII, p. 285; issued Nov. 29, 1916.
3856. *Monotoma picipes* Hbst. Winnipeg, Man., June 24, 1911, (Wallis).

Byrrhidæ.

3881. *Simplocaria metallica* Sturm. Truro, N.S., (record sent by W. H. Brittain).

Elateridæ.

(10,049a) *Hypnoidus* (*Cryptohypnus*) *lucidulus* Mann. Edmonton, Alta., May 6, 1916, (Carr).
4210. *Elater cordatus* Horn. Edmonton, Alta., April 1, 1915, (Carr).
4220. *Elater pullus* Germ. Smith's Cove, N.S., (record sent by W. H. Brittain).
4228. *Elater socer* Lec. Edmonton, Alta., June 14, 1916, (Carr).
4245. *Elater phoenicopterus* Germ. Mt. Lehman, B.C., April, 1911, (Hadwen).
4287. *Agriotes limosus* Lec. Edmonton, Alta., June 9, 1915, (Carr).
4297. *Dolopius lateralis* Esch. Millarville, Alta., June, (Tams).
4351. *Limonius crotchii* Horn. Millarville, Alta., May 23, 1914, (Tams).
4380. *Campylus denticornis* Kirby. Husavick, Man., July 5, 1915; Aug. 19, 1915, (Roberts and E. Coates).
4496. *Corymbites inflatus* Say. Millarville, Alta., May 23, (Tams).

Buprestidæ.

4582. *Dicerca asperata* L. & G. Three Rivers, Que., July, 1916, (Germain).
4583a. *Dicerca chrysea* Melsh. Edmonton, Alta., June 3, 1915, (Carr).
Poecilonota erecta. Edmonton, Alta., July 27, 1916, (Carr).
4606b. *Buprestis rusticorum* Kirby. Granville Ferry, N.S., (Payne).
4621. *Melanophila drummondi* Kirby. Edmonton, Alta., June 25, 1916, (Carr).
4625. *Melanophila aneola* Melsh. Peachland, B.C., July 18, 1915, (Wallis).
4630. *Anthaxia viridifrons* Lap. Peachland, B.C., July 14, 1915, (Wallis).
Chrysobothris breviloba Fall. Banff, Alta., July 2, 1915; Peachland, B.C., July 22, 1915, (Wallis).
4651. *Chrysobothris scabripennis* L. & G. Edmonton, Alta., June 18, 1916, (Carr).
4661. *Chrysobothris harrisii* Hentz. Husavick, Man., July 7, 1915, (Roberts).
4739. *Agrilus anxius* Gory. Edmonton, Alta., June 18, 1916, (Carr).

Lampyridæ.

4783. *Eros thoracicus* Rand. Husavick, Man., July 13, 1915, (Roberts).
4826. *Pyractomena lucifera* Melsh. Edmonton, Alta., June 14, 1915, (Carr).
4901. *Podabrus piniphilus* Esch. Banff, Alta., July 3, 1915, (Wallis).
4931. *Telephorus fraxini* Say. Edmonton, Alta., May 29, 1915, (Carr).
4940. *Telephorus scitulus* Say. Husavick, Man., July 4, 1915, (Roberts).
4953. *Telephorus tuberculatus* Lec. Kentville, N.S., (C. A. Good).

Cleridæ.

5136. *Cymatodera bicolor* Say. Husavick, Man., July 5, 1915, (Roberts).
5161. *Clerus apivorus* Germ. Larkin, B.C., (Brittain).

5185a. *Thanasimus nubilis* Kl. Edmonton, Alta., May 8, 1916, (Carr).
5191. *Hydnocera subfasciata* Lec. Peachland, B.C., July 23, 1915, (Wallis).

Ptinidæ.

5236. *Mezium americanum* Lap. Montreal Que., in hotel, Feb. 9, 1916, (Gibson).
5247. *Ernobius mollis* Linn. Kentville, N.S., (record sent by W. H. Brittain).
5292. *Xyletinus peltatus* Harr. Winnipeg, Man., July 1, 1911, (Wallis).
5296. *Xyletinus lugubris* Lec. Winnipeg, Man., June 27, 1915, (Wallis).
5376. *Lyctus planicollis* Lec. Winnipeg, Man., June 13, 1915, (Roberts).

Cioidæ.

Octotemnus laevus Casey. Winnipeg, Man., May 17, 1911, (Wallis); Onah, Man., May 24, 1912, (Wallis).

Scarabæidæ.

5524. *Aphodius congregatus* Mann. Edmonton, Alta., Sept. 27, 1915, (Carr).
Dichelonycha diluta Fall. Kentville, N.S., (Payne).
Dichelonycha vicina Fall. Vernon, B.C., (Brittain).
5705. *Diplotaxis obscura* Lec. Edmonton, Alta., May 20, 1916, (Carr).

Cerambycidæ.

5982. *Tetropium cinnamopterum* Kirby. Edmonton, Alta., June 29, 1916, (Carr).
6012. *Callidium hirtellum* Lec. Banff, Alta., July 4, 1915, (Wallis).
6189. *Clytus planifrons* Lec. Larkin, B.C., (Brittain).
6251. *Pachyta spurca* Lec. Swanlake, B.C., (Brittain).
6259. *Acmæops bivittata* Say. Aweme, Man., June 19, 1912, (T. Criddle).
6273. *Acmæops proteus* Kirby. Edmonton, Alta., July 19, 1916, (Carr).
6315. *Leptura exigua* Newn. Winnipeg, Man., June 19, 1915, (Wallis).
6324. *Leptura sexmaculata* Linn. Truro, N.S., (record sent by W. H. Brittain).
6361. *Leptura mutabilis* var. *luridipennis* Hald. Aweme, Man., June 9, 1906, (Wallis).
6479. *Saperda mutica* Say. Aweme, Man., June 22; July 27, 1911, (N. Criddle).
6480. *Saperda candida* Fab. Edmonton, Alta., July 17, 1916, (Carr).

Chrysomelidæ.

6541. *Donacia emarginata* Kirby. Kentville, N.S., (C. A. Good).
6554. *Zeugophora varians* Cr. Winnipeg, Man., June 13, 1915, (Roberts).
6560. *Syneta simplex* Lec. Edmonton, Alta., May 15, 1916, (Carr).
6605a. *Exema dispar* Lec. Winnipeg, Man., June 26, 1915, (Wallis).
6703. *Monachus saponatus* Fab. Husavick, Man., July 13, 1915, (Roberts).
6820. *Chrysomela basilaris* Say. Vernon, B.C., (Brittain).
6832. *Gastroidea cyanea* Melsh. Edmonton, Alta., June 24, 1915, (Carr).
6864. *Luperus varipes* Lec. Larkin, B.C., (Brittain).
6894. *Trirhabda attenuata* Say. Edmonton, Alta., July 28, 1916, (Carr).
(10,442) *Longitarsis erro* Horn. Winnipeg, Man., April 17, 1911, (Wallis).
7046. *Chætocnema subviridis* Lec. Husavick, Man., July 6, 1915, (Roberts).

Bruchidæ.

7124. *Bruchus discoideus* Say. Edmonton, Alta., July 15, 1916, (Carr).

Tenebrionidæ.

7404. *Haplandrus concolor* Lec. Winnipeg, Man., June 13, 1915, (Wallis).
7444. *Blapstinus interruptus* Say. Winnipeg, Man., June 6, 1911, (Wallis).
7520. *Platydema americanum* Lap. Winnipeg, Man., June 19, 1915, (Roberts).
Helops regulus Blaisd. Larkin, B.C., (Brittain).

Cistelidæ.

7594. *Hymenorus niger* Melsh. Husavick, Man., July 6, 1915, (Roberts).

Melandryidæ.

7665. *Enchodes sericea* Hald. Miami, Man., July 7, 1914, (Wallis).
7687. *Orchesia castanea* Melsh. Husavick, Man., July 8, 1915, (Roberts).
7695. *Canifa pallipes* Melsh. Husavick, Man., July 8, 1915, (Roberts).

Pythidæ.

7709. *Pytho niger* Kirby. Three Rivers, Que., June, 1916, (Germain).
7717. *Salpingus virescens* Lec. Edmonton, Alta., Sept. 1, 1915, (Carr).

Anthicidæ.

7876. *Stereopalpus vestitus* Say. Onah, Man., July 17, 1914, (Wallis).
7955. *Anthicus scabriceps* Lec. Husavick, Man., June 23, 1912, (Wallis).

Pyrochroidæ.

7993. *Schizotus cervicalis* Newm. Edmonton, Alta., May 23, 1915, (Carr).

Meloidæ.

8011. *Meloe strigulosus* Mann. Vernon, B.C., (Brittain).

Rhinomaceridæ.

8196. *Rhinomacer pilosus* Lec. Three Rivers, Que., May, 1916, (Germain).

Rhynchitidæ.

8221. *Rhynchites cyanellus* Lec. Truro, N.S., (record sent by W. H. Brittain; Edmonton, Alta., (Carr).

Attelabidæ.

8228. *Attelabus rhois* Boh. Three Rivers, Que., May, 1916, (Germain).

Otiorhynchidæ.

8258. *Anametis granulatus* Say. Truro, N.S., (record sent by W. H. Brittain).
8278. *Nocheles torpidus* Lec. Vernon, B.C., (Brittain).

Curculionidæ.

Apion finitimum Fall. Husavick, Man., April 22, 1912, (Wallis).
8433. *Phytonomus castor* Lec. Leduc, Alta., May 23, 1914, (Carr).

8437. *Lepyrus colon* Linn. Edmonton, Alta., (Carr).
Pissodes schwarzi Hopk. Edmonton, Alta., (Carr).
8475. *Pissodes affinis* Rand. Kentville, N.S., (C. A. Good).
8476. *Pissodes dubius* Rand. Three Rivers, Que., May, 1916, (Germain); Montreal, Que., (Beaulieu).
8619. *Magdalis subtincta* Lec. Winnipeg, Man., June 27, 1915, (Wallis).
8673. *Orchestes pallicornis* Say. Kentville, N.S., (C. A. Good).
8679. *Orchestes salicis* Linn. Truro, N.S., (record sent by W. H. Brittain).
8835. *Acanthocelis acephalus* Say. Onah, Man., July 15, 1914, (Wallis).

Platypodidæ.

* *Platypus wilsoni* Swaine. British Columbia, abundant on the coast as far north as Seymour Narrows and inland, in the south, to Agassiz; type collected at Campbell River, B.C., (Wilson and Swaine); Can. Ent., XLVIII, 97.

Ipidæ.

* *Orthotomicus lasiocarpi* Swaine. Roger's Pass, B.C.; Can. Ent., XLVIII, 183.
* *Pityokteines jasperi* Swaine. Jaspar Park, Alta.; Can. Ent., XLVIII, 182.
* *Ips chagnoni* Swaine. Montreal Island, Que., (G. Chagnon); abundant in Ontario and Quebec Provinces, (Swaine); Can. Ent., XLVIII, 186.
* *Ips vancouveri* Swaine. Quathiaski Cove, B.C.; on Vancouver Island and the coast of British Columbia; it occurs also at Kaslo, B.C., and probably elsewhere in the interior, (Swaine); Can. Ent., XLVIII, 188.
Conophthorus conicola Hopk. Pender Harbour, B.C., host cones of *Pinus monticola,* April 10, 1914, (Chrystal).
Dryocoetes confusus Swaine. Lesser Slave Lake, host *Abies balsamea,* August, (Swaine).
Dendroctonus murrayana Hopk. Banff, Alta., host *Pinus divaricata,* (Swaine).
Dendroctonus rufipennis Kirby. Algonquin Park, Ont., host *Pinus strobus,* Oct., (Swaine).
9183. *Dendroctonus simplex* Lec. Lesser Slave Lake, Alta., host *Larix americanus,* Aug., (Swaine).
9188. *Scierus annectens* Lec. Lesser Slave Lake, Alta., host White Spruce, Aug., (Swaine).
9195. *Hylastes porosus* Lec. Arrowhead, B.C., host *Pinus monticola,* (Swaine).
9198. (*Hylurgops*) *granulatus* Lec. Nanaimo, B.C., May, host *Abies grandis,* (Wilson).

Diptera.

(Arranged according to a Catalogue of North American Diptera, by J. M. Aldrich, Smithsonian Misc. Coll. XLVI, No. 1, 444. The numbers refer to the pages in the catalogue.)

Tipulidæ.

80. *Limnobia parietina* O. S. Ottawa, Ont., Aug. 1, 1906, (J. Fletcher).
* *Gonomyia californica* Alex. Peachland, B.C., May 19, 1912; Can. Ent., XLVIII, 324.
* *Trichocera* (*Diazosma*) *subsinuata* Johns. Waubamic, Parry Sound, Ont., June 13, 1915, (H. S. Parish); Jour. N.Y. Ent. Soc., XXIV, 124.
* *Limnophila terræ-novæ* Alex. Sandy Cove, Nfd., July 28, 1906, (O. Bryant); Jour. N.Y. Ent. Co., XXIV, 123.

95. *Bittacomorpha clavipes* Fab. Go Home Bay, Ont., May 23, 1912, (Walker).
95. *Bittacomorpha sackenii* Roeder. Massett, Q. C. I., 1898, (J. H. Keen).
96. *Xiphura frontalis* O. S. Ottawa, Ont., June 6, 1900, (Gibson).
97. *Pachyrhina erythrophrys* Will. Prince Albert, Sask., June 23, 1913, (Walker).
99. *Holorusia grandis* Bergr. Departure Bay, Vanc. Is., B.C., July 18, 1913, (Walker).
101. *Tipula bella* Lw. Go Home Bay, Ont., May 23, 1912, (Walker).
104. *Tipula trivittata* Say. Go Home Bay, Ont., June 20, Aug. 12, 1912, (Walker).
* *Tipula penicillata* Alex. "Hudson Bay Territory, (Kennicott)"; Proc. Acad. Nat. Sci., Philadelphia, LXVII, 496.
* *Tipula loewiana* Alex. "Fort Resolution, Hudson Bay Territory, (Kennicott)"; Proc. Acad. Nat. Sci., Philadelphia, LXVII, 489.
* *Tipula imperfecta* Alex. "Labrador, (Packard)"; Proc. Acad. Nat. Sci., Philadelphia, LXVII, 484.
* *Tipula piliceps* Alex. "Hudson Bay Territory, (Kennicott)"; Proc. Acad. Nat. Sci., Philadelphia, LXVII, 482.
* *Tipula kennicotti* Alex. "Fort Resolution, Hudson Bay Territory, (Kennicott)"; Proc. Acad. Nat. Sci., Philadelphia, LXVII, 481.
* *Tipula mainensis* Alex. Grand Lake, Nfd. July 25, 1906, (Bryant); Proc. Acad. Nat. Sci., Philadelphia, LXVII, 475.
* *Tipula pachyrhinoides* Alex. Farewell Creek, Southern Saskatchewan, Sept. 1907; Proc. Acad. Nat. Sci., Philadelphia, LXVII, 471.
* *Tipula algonquin* Alex. Go Home Bay, Muskoka, Ont., Aug. 16, 1912, (Clemens); Proc. Acad. Nat. Sci., Philadelphia, LXVII, 471.
* *Tipula parshleyi* Alex. Barber Dam, N.B., June 25, 1914, (McKenzie); Fredericton, N.B., June 10, 1914, (Tothill); "British America, (Scudder)"; Proc. Acad. Nat. Sci., Philadelphia, LXVII, 510.

Cecidomyidæ.

Diarthronomyia hypogæa H. Lw. This European insect has recently been found infecting chrysanthemums at Ottawa, Ont., (Gibson), and Victoria, B.C., (A. E. Cameron).
* *Dasyneura sassafras* Felt. Jordan, Ont., (not Gordon as stated in description), Aug. 12, 1915, (Ross); Can. Ent., XLVIII, 29.
156. *Dasyneura rhodophaga* Coq. Infesting buds of roses in greenhouse in Toronto, Ont., larvæ received at Ottawa, Oct., 1916. First occurrence as a greenhouse pest in Canada, (Gibson).

Bibionidæ.

165. *Bibio abbreviatus* Loew. Lethbridge, Alta., April 16, 1915, (Strickland).
166. *Bibio fraternus* Loew. Lethbridge, Alta., April 16, 1915, (Strickland).

Scatopsidæ.

Androvandiella halterata Mg. In Bull. No. 160, (April, 1916), Agric. Exp. Stn., Washington, Melander records this species in America, based on specimens collected at Waubamic, Parry Sound, Ont., June 14, 1915, and Sudbury, Ont., July 22, 1915).

Simuliidæ.

Simulium piscicidium Riley. Smoky R. Crossing, Alta., Aug. 24, 1915, (Strickland).

170. *Simulium vittatum* Zett. Bear Lake, Alta., Aug. 18, 1915, (Strickland).

Stratiomyidæ.

182. *Stratiomyia barbata* Loew. Mt. Cheam, B.C., July 23, 1915, (Treherne).
182. *Stratiomyia discalis* Loew. Kelowna, B.C., June 2, 1914, (Rhumann).
183. *Stratiomyia meigenii* Wied. Ottawa, Ont., June 16, 1913, (Beaulne).
184. *Odontomyia arcuata* Loew. Rosthern, Sask., July 17, 1916, (Sladen).
186. *Odontomyia interrupta* Oliv. Ottawa, Ont., May 29, 1899, (Gibson); July 16, 1913, (Beaulne).
190. *Nemotelus glaber* Loew. Ottawa, Ont., July 2, 1912, (Beaulieu).
Nemotelus polita Loew. Montreal, Que., June 8, 1906, (Beaulieu).

Tabanidæ.

194. *Pangonia tranquilla* O. S. Montfort, Que., July 12, 1916, (G. Chagnon). Only one record, viz., Levis, in Winn and Beaulieu's Quebec list of Diptera; Algonquin Park, Ont., Aug. 1, 1916, (Walker and Lozier).
195. *Chrysops celer* O. S. Algonquin Park, Ont., Aug. 17, 1904, (Hahn); Go-Home Bay, Ont., June 24, 1907, (W. J. Fraser); Toronto, Ont., June 16, 1915, (Walker).
195. *Chrysops moerens* Walk. De Grassi Point, Ont., July 21, 1916, (Walker).
196. *Chrysops delicatulus* O. S. Go-Home Bay, Ont., July 6, 31, 1907, (W. J. Fraser).
196. *Chrysops indus* O. S. Toronto, Ont., June 12, 1895, (Walker).
197. *Chrysops montanus* O. S. Go-Home Bay, Ont., July 1, 1907, (W. J. Fraser).
197. *Chrysops obsoletus* Wied. Ontario, (locality uncertain). Record from E. M. Walker.
Chrysops shermani Hine. Algonquin Park, Ont., July 31, 1916, (Walker).
199. *Hæmatopota americana* O. S. Ducks, B.C., July 20, 1915, (Hadwen).
200. *Tabanus actæon* O. S. Muskoka, Ont., July 29, 1888, (E. M. Morris).
201. *Tabanus astutus* O. S. Algonquin Park, Ont., July 28, 30, 1916, (Walker and Lozier); Go-Home Bay, Ont., June 28, 1907, (W. J. Fraser); Muskoka, Ont., July 21, 1888, (E. M. Morris).
202. *Tabanus coffeatus* Macq. Muskoka, Ont., July 21, 1888, (E. M. Morris).
202. *Tabanus comastes* Will. Mt. Cheam, B.C., July 1915, (Treherne).
204. *Tabanus hirtulus* Bigot. Agassiz, B.C., May 23, 1915, (Hadwen).
204. *Tabanus lasiophthalmus* Macq. De Grassi Point, Ont., June 26, 1915, (Walker).

Leptidæ.

211. *Arthropeas americana* Loew. Aweme, Man., June 25, 1913, (N. Criddle); Kinistino, Sask., July 10, (J. Fletcher).
212. *Xylophagus rufipes* Loew. Ottawa, Ont., June 6, 1909, (J. A. Letourneau).
213. *Glutops singularis* Burgess. Agassiz, B.C., June, 1915, (Treherne).

Bombyliidæ.

221. *Spogostylum pluto* Wied. Kaslo, B.C., July 20, (Cockle).

Asilidæ.

259. *Dioctria albius* Walk. Montfort, Que., July 12, 1916, (G. Chagnon). New to Quebec List.
259. *Dioctria sackeni* Will. Montfort, Que., July 12, 1916, (G. Chagnon). New to Quebec list.
260. *Cyrtopogon montanus* Loew. Victoria, B.C., June 1, 1885, (J. Fletcher).
260. *Cyrtopogon nebulo* O. S. British Columbia, Oct. 2, 1904. Specimen so labelled is in collection of Entomological Branch.
272. *Laphria ferox* Will. Vancouver, B.C., July, 1914, (Chrystal).
272. *Laphria pubescens* Will. Scotia Junction, Ont., July 7, 1907, (J. Fletcher).
280. *Promachus fitchii* O. S. Aweme, Man., July 13, 1907, (J. Fletcher).
283. *Asilus sadyates* Walk. St. John's Que., July 7, 1916, (G. Chagnon). New to Quebec list.

Empidæ.

311. *Drapetis medetera* Mel. Estevan, Sask., May 20, (N. Criddle).

Phoridæ.

* *Phora* (=*Trineura*) *viridinota* Brues. Treesbank, Man., May 30, (N. Criddle); Can. Ent., XLVIII, 394.

Platypezidæ.

* *Callimyia velutina* Johns. Brule Lake, Ont., Aug. 3, 1911, (M. C. Van Duzee); Psyche, XXIII, 32.

Syrphidæ.

346. *Microdon globosus* Fab. Manitoba, Aug. 19, 1900; 2 specimens so labelled in collection of Entomological Branch.
Eumerus strigatus Fall. In the collection at Ottawa is a specimen taken by the late Dr. J. Fletcher at Ottawa on Aug. 19, 1904, which had been placed among specimens of *Xylota ejuncida*. This represents the first capture in the open, that we know of, for Canada. We have a number of specimens reared from imported narcissus bulbs, (Gibson).
362. *Leucozona lucorum* L. Smith's Cove, N.S., July 4-15, 1914, (Gibson).
* *Volucella bombylans arctica* Johns. Labrador: Rama, 1898, (A. Stecker and J. D. Sornborger: Nain, (J. D. Sornborger): Nain, Aug. 18, 1908, (O. Bryant): Psyche XXIII, 163.
* *Volucella bombylans lateralis* Johns. Lewisport, Nfd., July, (L. D. Gratacap); Red Indian Lake, Nfd., June 20, 1906, (O. Bryant); Psyche, XXIII, 161.
383. *Arctophila flagrans* O. S. Banff, Alta., July 18, 1916, (Hewitt).
398. *Xylota analis* Will. Mt. Cheam, B.C., July 21, 1905, (Treherne).
398. *Xylota barbata* Loew. Aylmer, Que., June 24, 1913, (Beaulne). New to Quebec list.
398. *Xylota bicolor* Loew. Chelsea, Que., May 26, 1900, (Gibson). New to Quebec list.
398. *Xylota ejuncida* Say. Stuart River, Yukon Territory, 1909, (D. H. Nelles).
400. *Xylota vecors* O. S. Ottawa, Ont.; St. Louis, Sask., 1898, (E. Coubeaux).

402. *Criorhina armillata* O. S. Inverness, B.C., July, 1910, Metlakatla, B.C., Aug., 1911, (J. H. Keen).

Œstridæ.

416. *Hypoderma lineata* DeV. Cadbora Bay, B.C., on flowers of *Camassia quamash*, May 10, 1916; first capture of the male of this species in British Columbia, (Treherne).

Tachinidæ.

426. *Gymnophania montana* Coq. Lethbridge, Alta., May 15, 1916, (Strickland). New to Canada, (J. M. A.).

* *Exorista caesar* Aldrich. Reared from *Archips argyrospila* from Simcoe, Ont., July 1-15, 1915, (Caesar); Can. Ent., XLVIII, 20.

* *Frontina spectabilis* Aldrich. Waubamic, Parry Sound, Ont., Aug. 5, 1915, (H. S. Parish); Can. Ent., XLVIII, 22.

Sarcophagidæ.

* *Sarcophaga aldrichi* Parker. "Canada, (Quebec)"; Jour. Econ. Ent., Vol. 9, p. 438. Mountain, Ont., larvæ found in great frequency in pupæ of Forest Tent-caterpillar, (Caesar).

* *Sarcophaga pachyprocta* Parker. "Canada, (Manitoba ?)"; Jour. N.Y. Ent. Soc., XXIV, 171.

* *Sarcophaga fletcheri* Ald. Aweme, Man., June 19, 1903, (J. Fletcher); Sarcophaga and Allies in North America, (Thomas Say Foundation), p. 96; issued Nov. 30, 1916.

* *Sarcophaga reversa* Ald. "Montreal, Que., (Harbeck)"; Sarcophaga and Allies in North America, p. 135.

* *Sarcophaga falciformis* Ald. Aweme, Man., July 25, 1913, (not 1813 as in description); Sarcophaga and Allies in North America, p. 137.

* *Sarcophaga aculeata* Ald. "London, Ont., (Hough coll.)"; Sarcophaga and Allies in North America, p. 143.

* *Sarcophaga occidentalis* Ald. Vancouver, B.C., July 27, 1907, (R. V. Harvey); Sarcophaga and Allies in North America, p. 198.

* *Sarcophaga tuberosa sarraceniodes* Ald. Okanagan Valley, B.C., ex. *Anabrus*, emerged April, 1896, (J. Fletcher); Sarcophaga and Allies in North America, p. 227.

Muscidæ.

524. *Protocalliphora azurea* Fall. Ottawa, Ont., Aug. 6, 1914, (Beaulne).

Anthomyidæ.

* *Hydrotæa hough*i Mall. London, Ont., (ex. Coll. Hough); Bull. Brooklyn Ent. Soc., XI, p. 110.

535. *Hydrotæa unispinosa* Stein. Wakefield, Que., June 18, 1915, (Hewitt).
Mydæa punctata Stein. Lethbridge, Alta., June 14, 1916, (Strickland).

* *Mydæa pectinata* Johannsen. Millville, N.S.; Trans. Amer. Ent. Soc., XLII, p. 392.

* *Phaonia apicata* Johannsen. Truro, N.S., Aug.; Trans. Amer. Ent. Soc., XLII, p. 396.

563. *Schoenomyza dorsalis* Loew. Lethbridge, Alta., June 5, 1916, (Strickland).

Sciomyzidæ.

Tetanocera flavipes Loew. Aweme, Man., July 1, 1913, (N. Criddle).
Tetanocera sparsa Loew. Ottawa, Ont., July 17, 1904, (W. Metcalfe).
580. *Sepedon armipes* Loew. Brockville, Ont., Sept. 20, 1903, (Metcalfe).

Ortalidæ.

Tetanops aldrichi Hendel. Lethbridge, Alta., May 15, 1916, (Strickland). New to Canada, (J. M. A.).
598. *Seoptera vibrans* L. Teulon, Man., June 19, 1915, (W. Chesney).

Trypedidæ.

603. *Stenopa vulnerata* Loew. Banff, Alta., (Sanson).
606. *Rhagoletis pomonella* Walsh. Aweme, Man., Aug. 8, 1916, (N. Criddle); Penticton, B.C., July 26, 1916, (Treherne).

Ephydridæ.

Psilota compta Mg. Lethbridge, Alta., May 15, 1916, (Strickland).
627. *Hydrellia formosa* Loew. Ottawa, Ont., July 12, 1916, (Beaulieu).
Philygria picta. Ottawa, Ont., July 12, 1916, (Beaulieu); Estevan, Sask., May 20, 1916, (N. Criddle).
627. *Philygria fuscicornis* Loew. Lethbridge, Alta., May-June, (Strickland).
627. *Hyadina albovenosa* Coq. Aweme, Man., Aug. 3, 1916, (N. Criddle).

Oscinidæ.

633. *Diplotoxa microcera* Loew. Strathroy, Ont., (H. G. Crawford); Ottawa, Ont., Aug. 9, 22, 1916, (Beaulieu).
633. *Chlorops graminea* Coq. Aweme, Man., June 27, 1916, (N. Criddle). New to Canada, (J. M. A.).
633. *Chloropisca grata* Loew. Aweme, Man., Aug. 22, 1916, (N. Criddle); Ottawa, Aug. 31, 1916, (Beaulieu); Sept. 12, (Miss G. Beaulieu).
Chloropisca pulla Ad. Lethbridge, Alta., May 15, 1916; Ogema, Sask., June 18, 1916, (N. Criddle); Aweme, Man., June 9, 12, (N. Criddle). New to Canada, (J. M. A.).
634. *Chlorops producta* Loew. Aweme, Man., Aug. 15, 1916, (N. Criddle).
634. *Chlorops sulphurea* Loew. Ogema, Sask., June 18, 1916, (N. Criddle).
634. *Chloropisca varipes* Loew. Aweme, Man., June 12, 1916, (N. Criddle).
634. *Diplotoxa recurva* Ad. Maryfield, Sask., Sept. 2, (N. Criddle).
635. *Hippelates plebeius* Loew. Ottawa, Ont., Sept. 9, 1916, (Miss G. Beaulieu).
Tricimba cincta Mg. Ottawa, Ont., July 29, 1916, (Beaulieu); Aweme, Man., June 27, (N. Criddle).
Elachiptera decipiens Loew. Ogema, Sask., June 17, 1916, (N. Criddle).
636. *Elachiptera costata* Loew. Estevan, Sask., May 20, 1916, (N. Criddle); Ogema, Sask., June 17, 1916, (N. Criddle); Aweme, Man., Sept. 4, 1916, (N. Criddle); Hemmingford, Que., July 27, 1916, (Petch). New to Quebec list.
636. *Elachiptera eunota* Loew. Aweme, Man., Aug. 22, 1916, (N. Criddle). New to Manitoba.

Siphonella aequa Becker. Hemmingford, Que., Aug. 10, 1916, (Petch). New to Quebec list.

Siphonella geniculata DeG. Estevan, Sask., May 20, 1916, (N. Criddle).

Siphonella neglecta Becker. Aweme, Man., Aug. 15, 1916, (N. Criddle).

Siphonella nigripalpis Mall. Strathroy, Ont., June 20, 1916, (H. G. Crawford); Hemmingford, Que., July 28, 1916, (Petch). New to Quebec list.

Siphonella parra Ad. Hemmingford, Que., July 28, Aug. 10, 1916, (Petch). New to Quebec list.

637. *Siphonella pumilionis* Bj. Aweme, Man., Aug. 15, 1916, (N. Criddle).

Oscinis dissidens Tucker. Ottawa, Ont., July 12, 1916, (Beaulieu).

Oscinis melancholica Becker. Ottawa, Ont., Aug. 31, Sept. 9, 1916, (Beaulieu).

639. *Oscinis umbrosa* Loew. Strathroy, Ont., Aug. 9, 1916, (H. G. Crawford); Hemmingford, Que., June 27, July 28, 1916, (Petch). New to Quebec list.

Drosophilidæ.

* *Drosophila sulcata* Sturtevant. "Ottawa, Can.; Annals Ent. Soc. Amer., IX, 330."

Geomyzidæ.

Trixocelis fumipennis Mall. Aweme, Man., June 12, 1916, (N. Criddle).

Anthomyza gracilis Fall. Aweme, Man., Aug. 3, 1916, (N. Criddle). New to Manitoba.

Agromyzidæ.

647. *Phytomyza nigritella* Zett. Estevan, Sask., May 20, 1916, (N. Criddle). New to Saskatchewan.

Phytomyza bipunctata Lw. Estevan, Sask., May 20, 1916, (N. Criddle). New to Saskatchewan.

647. *Cerodonta dorsalis* Loew. Strathroy, Ont., Aug. 23, 28, 1916, (H. G. (Crawford); Ottawa, Ont., Aug. 17, 1916, (Beaulieu); Hemmingford, Que., Aug. 10, 1916, (Petch). New to Quebec list.

Paramyia nitens Loew. Mer Bleue, near Ottawa, Ont., June 26, 1904, (Metcalfe).

Agromyza coniceps Mall. Aweme, Man., June 2, 1916, (N. Criddle). New to Canada.

Agromyza coquilletti Mall. Strathroy, Ont., July 4, 1916, (H. G. Crawford).

Agromyza fragariæ Mall. Estevan, Sask., May 20, 1916, (N. Criddle).

Agromyza immaculata Coq. Ogema, Sask., June 17, 1916, (N. Criddle).

648. *Agromyza jucunda* Van der Wulp. Estevan, Sask., May 20, 1916, (N. Criddle); Hemmingford, Que., July 28, 1916, (Petch). New to Quebec list.

Agromyza laterella Zett. Ottawa, Ont., May 25, 1916, (Beaulieu); Aweme, Man., Aug. 4, 15, 1916, (N. Criddle).

648. *Agromyza longipennis* Loew. Aweme, Man., Aug. 15, 1916, (N. Criddle). New to Manitoba.

Agromyza nasuta Mel. Hemmingford, Que., Aug. 10, 1916, (Petch). New to Quebec list. Mines in dandelion, (J. M. A.).

Agromyza scutellata Fall. Estevan, Sask., May 20, 1916, (N. Criddle).

Agromyza vibrissata Mall. Aweme, Man., June 12, 1916, (N. Criddle).

649. *Agromyza virens* Loew. Aweme, Man., Aug. 22, 1916, (N. Criddle); Ottawa, Ont., July 21, 1916, (Beaulieu).

649. *Desmometopa latipes* Mg. Hemmingford, Que., Aug. 10, 1916, (Petch). New to Quebec list.

Desmometopa sordida Fall. Hemmingford, Que., Aug. 10, 1916, (Petch). New to Quebec list.

651. *Pholeomyia indecora* Loew. Strathroy, Ont., July 4, 1916, (H. G. Crawford).

Ochthiphila aridella Fall. Hemmingford, Que., Aug. 10, 1916, (Petch). New to Quebec list. Aweme, Man., Sept. 4, 1916, (N. Criddle).

652. *Ochthiphila polystigma* Mg. Strathroy, Ont., Aug. 9, 1916, (H. G. Crawford).

Hymenoptera.

Much valuable material is being accumulated and worked over as opportunity offers. The aculeate hymenoptera are receiving close study by Mr. F. W. L. Sladen, of Ottawa, who has visited many parts of Canada during 1916 and made valuable collections. Through the courtesy of Dr. H. T. Fernald, of the Massachusetts Agricultural College, Amherst, Mass., Mr. J. F. Martin examined ichneumonid material, and the records of these given below are of interest in adding to our knowledge of their distribution in Canada.

Tenthredinidæ.

Zaschizonyx montana (Cress.). Ottawa, Ont., Aug. 1915, (Germain). New to Canada, (S. A. R.).

Macrophya crassicornis Prov. Ottawa, Ont., June, 1915, (Germain).

Pachynematus extensicornis Nort. Ottawa, Ont., July, 1915, (Germain).

Pachynematus tritici Marl. Ottawa, Ont., July, 1915, (Germain).

Pontania robusta Marl. Ottawa, Ont., June, 1915, (Germain). New to Canada, (S. A. R.).

Blennocampa aperta MacG. Ottawa, Ont., July, 1915, (Germain). New to Canada, (S. A. R.).

Ichneumonidæ.

Exochus propinquus Cr. Lethbridge, Alta., July 3, 1913, (Strickland).

Bassus orbitalis Cr. Lethbridge, Alta., Sept. 21, 1913, (Strickland).

Mesoleius tenthredinis Morley. This European parasite of the Large Larch Sawfly, *Nematus erichsonii*, introduced into Manitoba by Dr. C. Gordon Hewitt (Rep. Dom. Entomologist, for year ending March 31, 1913) has in 1916, been captured near Aweme, Man., by Mr. Norman Criddle, on the dates June 2 to 21.

Cryptus luctuosus Cr. Lethbridge, Alta., Sept. 20, 1913, (Strickland).

Ichneumon calitergus Cr. Ottawa, Ont., Aug. 26, 1899, (J. Fletcher).

Ichneumon lewisii Cr. Ottawa, Ont., Aug. 28, 1906, (Young).

Ichneumon longulus Cr. Aweme, Man., Aug. 20, 1915, (N. Criddle).

Ichneumon vicinus Cr. Ottawa, Ont., April 21, 1900, (Gibson).
Ichneumon subdolus Cr. Nipigon, Ont., July 11, 1907, (J. Fletcher).
Amblyteles montanus Cr. Ottawa, Ont., Aug. 24, 1903, (J. Fletcher).
Trogus quebecensis Prov. Hymers, Ont., July 21, 1910, (Dawson).

Trichogrammidæ.

* *Trichogramma tomyia tortricis* Girault. Guelph, Ont., from eggs of *Tortrix cerasivorana,* (Bethune); Can. Ent., XLVIII, 268.

Encyrtidæ.

* *Aphycus rileyi* Timb. Guelph, Ont., reared from *Lecanium corni* on ash, June 9, 1907, (T. D. Jarvis); Proc. U.S.N.M., Vol. 50, p. 600.
* *Berecyntus bakeri gemma* Girault. Reared at Ottawa from *Euxoa* larva from Queensboro, Ont., also from larva of *Hadena devastatrix,* Ottawa, Ont., July 12, 1914, (Gibson); Psyche XXIII, 49.

Thynnidæ.

Methoca bicolor Say. Prince Albert, Sask., male, July 22, 1916, (Sladen).

Mutillidæ.

Mutilla hexagona Say. Toronto, Ont., males, July, August, 1888-1894, (W. Brodie).
Mutilla canadensis Blake. Weymouth, N.S., female, June 5, 1913, (Sanders).

Myrmosidæ.

Myrmosa unicolor Say. Aweme, Man., male, July 7, 1915, (N. Criddle); Prince Albert, Sask., July 22, 1916, (Sladen).

Tiphiidæ.

Paratiphia albilabris Spin. Okanagan, B.C., female, Aug. 4, 1915, (Anderson); Victoria, B.C., Aug. 13, 1916, (Sladen).

Sapygidæ.

Sapyga martini Sm. Aweme, Man., May 2, 9, 1915, (N. Criddle).

Eumenidæ.

Odynerus capra Sauss. Truro, N.S., Aug. 16, 1915, (Brittain).

Philanthidæ.

Eucerceris superbus Cr. Medicine Hat, Alta., male, Aug. 20, 1916, (Sladen).
Eucerceris bicolor Cr. Medicine Hat., Alta., female, Aug. 20, 1916, (Sladen). Mr. Sladen considers the evidence strong that this species is the female of *E. superbus.*
Eucerceris flavocinctus Cr. Indian Head, Sask., July 14, 1916, (Sladen); Kaslo, B.C., July 20, 1906, (Cockle); Sidney, B.C., July 6, 1914, (Sladen).

Eucerceris fulvipes Cr. Aweme, Man., (N. Criddle); Medicine Hat, Alta., male, Aug. 20, 1916, (Sladen).
Cerceris clypeata Cr. (var. with cream-colored bands). Prince Albert, Sask., female, July 22, 1916, (Sladen).
Cerceris dentifrons. Toronto, Ont., Aug. 1, 1893, (W. Brodie).
Cerceris pleuralis H. S. Smith. Toronto, Ont., Aug. 1, 1893, (W. Brodie).
Cerceris rufinoda Cr. Medicine Hat, Alta., Aug. 20, 1916, (Sladen).
Cerceris rufinoda crucia Vier. & Ckll. Medicine Hat, Alta., Aug. 20, 1916, (Sladen).
Philanthus solivagus Say. Kentville, N.S., Aug. 22, 1915, (Brittain); Aweme, Man., July 29, 1915, (N. Criddle).
Philanthus bilunatus Cr. St. Stephen, N.B., July 18, 1916, (Sanders); Melfort, Sask., July 20, 1916, (Sladen).
Philanthus politus Say. Prince Albert, Sask., July 22, 1916; Calgary, Alta., July 29, 1916, (Sladen).
Philanthus albopilosus Cr. Aweme, Man., Aug. 20, 1914, (N. Criddle); Medicine Hat, Alta., Aug. 20, 1916, (Sladen).
Philanthus sanbornii Cr. Toronto, Ont., Aug. 4, 1895, (W. Brodie).
Philanthus punctatus Say. Thompson River, B.C., Aug. 8, 1914, (Wilson); Crescent, B.C., Aug. 14, 1916; Agassiz, B.C., Aug. 10, 1916; Medicine Hat, Alta., Aug. 20, 1916, (Sladen).
Aphilanthops frigidus Sm. Radisson, Sask., July 30, 1907, (J. Fletcher); Medicine Hat, Alta., Aug. 20, 1916; Lethbridge, Alta., June 28, 1914; Victoria, B.C., Aug. 13, 1916, (Sladen).

Bembecidæ.

Bembex pruinosa Fox. Aweme, Man., Aug. 20, 1914, (N. Criddle).
Bembex amœna Fox. Nicola Valley, B.C., June, 1912, (S. Hadwen).
Monedula emarginata Cr. Prince Albert, Sask., July 22; Lethbridge, Alta., July 25, 1916, (Sladen).

Andrenidæ.

* *Andrena ricardonis* Ckll. Vernon, B.C., June 9, 1902, (Miss Ricardo); Can. Ent., XLVIII, 272.
Andrena cockerelli Graen. Smith's Cove, N.S., May 26, 1915, (Brittain).
Andrena bicolor Prov. Smith's Cove, N.S., June 5, 1915, (Brittain).
Andrena vicina Sm. Smith's Cove, N.S., May 30, 1915, (Brittain).
Andrena carlini Ckll. Smith's Cove, N.S., May 25, 1915, (Brittain).

Nomadidæ.

* *Nomada vernonensis* Ckll. Vernon, B.C., April 15, 1902, (Miss Ricardo); Can. Ent., XLVIII, 273.

Megachilidæ.

Anthidium tenuifloræ Ckll. Banff, Alta., July 24, 1911, (Sanson); Radisson, Sask., July 29, 1907; Saskatoon, Sask., July 18, 1909, (Willing); Invermere, B.C., June 30, 1914, (Sladen).
Anthidium emarginatum Say. Aweme, Man., July 20, 1914, (N. Criddle); Banff, Alta., Aug. 17, 1911, (Sanson).

Dianthidium simile Cr. Guelph, Ont., 1913, (A. Burrows); Ottawa, July 7, 1913, (Sladen).

Microstelis lateralis Cr. Toronto, Ont., June 24, 1894, (W. Brodie); Aylmer, Que., June 5, 1915, on *Potentilla,* (Sladen).

Pavostelis montana Cr. Lethbridge, Alta., June 28, 1914, (Sladen); Banff, Alta., (Sanson).

* *Stelis ontariana* Sladen. Ottawa, Ont., Aug. 16, 1912, (Beaulne); Bethesda, Ont., Aug. 15, 1892, (W. Brodie); Can. Ent., XLVIII, 312.

* *Autochelostoma canadensis* Sladen. Ottawa district, Ont., Aug. 14, 1914, (Germain); Can. Ent., XLVIII, p. 270.

Chelynia subemarginata Cr. Toronto, Ont., June 23, 1891. (W. Brodie); Aylmer, Que., June 24, 1913, (Beaulne); Dalhousie, N.B., July 24, 1915, (Sladen).

Chelynia foederalis Sm. Toronto, Ont., June 9, 1896, (W. Brodie); Ottawa, June 11, 1913, (Sladen).

Chelynia rubri Ckll. Banff, Alta., June 25, 1908, (Sanson).

Heriades carinatus Cr. Invermere, B.C., June 30, 1914, (Sladen).

Chlorosmia fulgida Cr. Banff, Alta., (Sanson); Invermere, B.C., July 1, 1914, (Sladen).

* *Formicapis clypeata* Sladen. Aweme, Man., July 6, 1915, (Criddle); Waterhole, Alta., Aug. 18, 1915, (Strickland); Melfort, Sask., July 20, 1916, (Sladen); Can. Ent., XLVIII, p. 271.

Osmia cobaltina Cr. Shawnigan, B.C., July 7, 1914, (Sladen); Peachland, B.C., July 24, 1909, (Wallis).

Osmia kenoyeri Ckll. White River, Ont., June 3, 1915, (Sladen).

Osmia nigrifrons Cr. Invermere, B.C., June 30, 1914, (Sladen).

Osmia novomexicana Ckll. Aweme, Man., April 30, 1910, (N. Criddle); Medicine Hat, Alta., May 30, 1904, (Willing).

Osmia chalybea Sm., var. *faceta* Cr. Ottawa, Ont., July 26, 1913, (Sladen); Toronto, Ont., July 26, 1890, (W. Brodie).

Osmia chalybea Sm. var. *mandibularis* Cr. Lethbridge, Alta., July 8, 1909, (Wallis).

Osmia densa Cr. Banff, Alta., May 17, 1915; Golden, B.C., May 16, 1915; Shawnigan, B.C., July 7, 1914, (Sladen).

Osmia albiventris Cr. Ottawa, Ont., June 11, 1913; White River, Ont., June 3, 1915; Banff, Alta., May 21, 1915, (Sladen).

Osmia atriventris Cr. St. John, N.B., May 23, 1903, (Leavitt); Aweme, Man., May 2, 1914, (N. Criddle); Ottawa, Ont., May 18, 1913; Banff, Alta., May 21, 1915, (Sladen).

Osmia melanotricha Lov. & Ckll. Toronto, Ont., June 10, 1894, (W. Brodie); Ottawa, Ont., June 18, 1913, (Sladen).

Osmia hudsonica Cr. Banff, Alta., May 21, 1915, (Sladen).

Megachile (Oligotropus) exilis, subexilis, Ckll. Males, Ottawa, Ont., July 15, 1913; Kaslo, B.C., Penticton, B.C., Aug., 1916, (Sladen).

Megachile fidelis Cr. Summerland, B.C., Aug. 9, 1916, (Sladen).

Megachile pugnata Say. Edmonton, Alta., July 11, 1916, (Carr); Salmon, Arm, B.C., July 4, 1914; Shawnigan, B.C., July 7, 1914, (Sladen).

Megachile manifesta Cr. Davidson, Sask., Aug. 21, 1907, (Willing); Medicine Hat, Alta., Aug. 20, 1916; Lethbridge, Alta., July 28, 1916; Swift Current, Sask., Aug. 22, 1916, (Sladen).

Megachile melanophaea Sm. Halifax, N.S., July 10, 1916, (Perrin).
Megachile melanophaea var. *calogaster* Ckll. Lethbridge, Alta., June 28, 1914, (Sladen).
Megachile latimanus Say. Smith's Cove, N.S., July 15, 1914, (Gibson); Melfort, Sask., July 20, 1916; Lethbridge, Alta., June 28, 1913, (Sladen).
Megachile perihirta Ckll. Salmon Arm, B.C., July 14, 1914, Lethbridge, Alta., June 28, 1914, (Sladen).
Megachile latimanus Ckll., (not Say.). Lethbridge, Alta., June 28, 1914, (Sladen).
Megachile vancouverensis Prov. St. John, N.B., July 13, 1901, (Leavitt); Kaslo, B.C., June 10, 1906, (Cockle); Ottawa, Ont., Aug. 15, 1913; Invermere, B.C., June 30, 1914, (Sladen).
Megachile inermis Prov. (*decipiens* Lov. & Ckll.). St. John, N.B., July 1, 1901, (A. G. Leavitt); Dalhousie, N.B., July 24, 1915; Hull, Que., June 14, 1914; Haileybury, Ont., July 7, 1916, (Sladen); Bondville, Que., July 30, (Winn); Dunvegan, Alta., Aug. 18, 1915, (Strickland); Aweme, Man., June 29, 1915, (N. Criddle).
Megachile parallela Ckll. Thompson River, B.C., Aug. 8, 1914, (Wilson); Medicine Hat, Alta., Aug. 20, 1916, (Sladen); Swift Current, Sask., Aug. 22, 1916, (Sladen).
Megachile generosa Cr. Aweme, Man., July 13, 1916, (N. Criddle); Lethbridge, Alta., July 28, 1916, (Sladen).
Megachile brevis Say. Haileybury, Ont., July 5, 1916, (Sladen); Summerland, B.C., Aug. 10, 1916, (Sladen).
Coelioxys ribis Ckll. Truro, N.S., July 4, 1913, (C. B. Gooderham); Haileybury, Ont., July 5, 1916, (Sladen); Aweme, Man., July 13, 1916, (N. Criddle).

Bombidæ.

Bombus rufocinctus Cr. Charlottetown, P.E.I., Sept., 1916, (Sladen).
Bombus californicus Smith. Prince Albert, Sask., July 22, 1916, (Sladen).
Bombus perplexus Cr. Montreal, Que., (Winn).
Psithyrus ashtoni Cr. Truro, N.S., Aug. 25, 1915, (Brittain).
Psithyrus fernaldae Frank. Banff, Alta., July 15, 1915, (Sanson); Quebec, Que., Aug. 8, 1914, (Sladen).

Hemiptera.

(Arranged according to a Check List of the Hemiptera—excepting the Aphididæ Aleurodidæ and Coccidæ—of America, north of Mexico, by E. P. Van Duzee; New York Entomological Society, 1916.)

Aphididæ.

Phylloxera querceti Pergande. Vineland, Ont., on oak, Sept. 2, 1916, (Ross).
Phyllaphis quercicola Baker (*querci* Davis). Vineland, Ont., on oak, Sept. 30, 1916, (Ross).
Myzocallis punctatus Monell. Vineland, Ont., on oak, June 4, 1915, (Ross).

Myzocallis discolor Monell. Vineland, Ont., on oak, Sept. 30, 1916, (Ross).

Chaitophorus quercicola Monell. Vineland, Ont., on oak, Oct. 30, 1916, (Ross).

Monellia caryae Monell. Vineland, Ont., on black walnut, Aug. 17, 1916, (Ross).

Macrosiphum crataegi Monell. Vineland, Ont., on hawthorn, Oct. 11, 1916, (Ross).

Macrosiphum pelargonii Kalt. Vineland, Ont., on *Lillium,* Jan. 28, 1916, (Ross).

Myzus circumflexum Buckton. Grimsby, Ont., on *Lillium,* Jan. 1, 1916, (Ross).

Myzus neorosarum Theobald. Vineland, Ont., on *Rosa rugosa,* Aug. 18, Oct. 24, 1916, (Ross).

Myzus rosarum Kalt. Vineland, Ont., on rose, July 26, 1916, (Ross).

Aphis brevis Sanderson. Arkona, Ont., and Vineland, Ont., on hawthorn and apple, Oct. 1916, (Ross).

Aphis bakeri Cowen. Arkona, Ont., and Vineland, Ont., on hawthorn and apple, Oct., 1916, (Ross).

Aphis pseudobrassicæ Davis. Turnips infested with this species were received at Ottawa, from Sarnia, Ont., on Sept. 9, 1916. This is the first record of this aphid in Ontario, (Gibson).

Van Duzee's Number.

Cydnidæ.

28. *Thyreocoris nitiduloides* Wolff. Brantford, Ont., (record sent by W. H. Brittain).

Pentatomidæ.

87. *Brochymena tenebrosa* Walk. St. Hilaire, Que., May 24, 1916, (Moore).

122. *Euschistus conspersus* Uhl. Departure Bay, Vanc. Is., B.C., July 21, 1913, (Walker).

127. *Euschistus ictericus* Linn. Toronto, Ont., Sept. 12, 1906, (Walker).

Coreidæ.

Corynocoris typhæus distinctus Dall. Toronto, Ont., Sept. 28, 1896, (Walker).

Aradidæ.

379. *Aradus crenatus* Say. St. Hilaire, Que., May 24, 1916, (Moore).

414. *Aneurus inconstans* Uhl. Toronto, Ont., April 18, 1895, May 8, 1914, (Walker).

Lygæidæ.

432. *Oncopeltus fasciatus* Dall. London, Ont., (H. S. Saunders).

477. *Ischnorrhynchus geminatus* Say. Toronto, Ont., Guelph, Ont., (C. A. Good).

588. *Stignocoris rusticus* Fall. Truro, N.S., (C. B. Gooderham).

Stignocoris pedestris. Truro, N.S., (record sent by W. H. Brittain, who stated that Mr. Parshley, who determined the specimen informed him that the species was new to North America.)

589. *Trapezonotus arenarius* Linn. (*agrestis* Fall). Ottawa, Ont., Aug. 23, 1914, (Germain).

Tingididæ.

665. *Physatocheila plexa* Say. St. Hilaire, Que., May 24, (Moore).
666. *Leptoypha mutica* Say. De Grassi Point, Ont., Aug. 11, 1916, (Walker).

Nabidæ.

826. *Nabis limbatus* Dahlb. Toronto, Ont., March 29, 1904, (R. E. Coleman).
827. *Nabis flavomarginatus* Schol. Truro, N.S., (record sent by W. H. Brittain).

Anthocoridæ.

865. *Triphleps tristicolor* White. Vineland, Ont., found preying on *Thrips tabaci*, Aug. 25, 1916, (Ross).
871. *Dufouriellus ater* Duf. Toronto, Ont., April 13, 1895, (Walker).

Miridæ.

922. *Phytocoris lasiomerus* Reut. De Grassi Point, Ont., Aug. 6, 1895; Algonquin Park, Ont., Aug. 14, 1903, (Walker).
979. *Paracalocoris scrupeus* Say. Hamilton, Ont., June 20, 1914, (Walker).
996. *Dichrooscytus suspectus* Reut. Pictou, N.S., July 22, 1914, (Walker).
* *Lygus communis novascotiensis* Knight. Kentville, N.S., Wolfville, N.S.; Smith's Cove, N.S., July 6-28, 1915, (Brittain); Can. Ent., XLVIII, 349.
1018. *Lygus belfragii* Reut. Hamilton, Ont., June 20, 1914, (Walker).
1127. *Heterocordylus malinus* Reut. Hamilton, Ont., June 20, 1914, (Walker).
1139. *Ceratocapsus pumilis* Uhl. Truro, N.S., (record sent by W. H. Brittain).
* *Orthotylus cruciatus* Van D. St. Hilaire, Que., July 4, 1907, (Metcalfe); Proc. Cal. Acad. Sci., VI, 119.
1172. *Orthotylus flavosparsus* Sahlbg. St. Catharines, Ont., June 19, 1914, (Walker).

Gerridæ.

1285. *Gerris conformis* Uhl. Kentville, N.S., (record sent by W. H. Brittain).

Saldidæ.

1328. *Saldula interstitialis* Say. Guelph, Ont., (C. A. Good).

Nepidæ.

1382. *Ranatra nigra* H. S. Go-Home Bay, Ont., Aug. 10, 1908, (T. R. Hanley).
1384. *Ranatra brevicollis* Montd. Lonely Lake, Vanc. Is., B.C., July 31, 1913, (Walker).

Cicadidæ.

1523. *Okanagana norehoracensis* Emmons. Toronto, Ont., May 8, 1896, (Walker).

Cercopidæ.

1550. *Aphrophora permutata* Uhl. Departure Bay, Vanc. Is., B.C., Aug. 3, 1913, (Walker).
1553. *Aphrophora signoretii* Fh. Toronto, Ont., July 12, 1914, (Walker).

Membracidæ.

1628. *Telamona declivata* Van D. Rainy River, Ont., July 22, 1913, (Walker).
1635. *Telamona reclivata* Fh. Edmonton, Alta., July 7, 1910, (Carr).
1644. *Telamona querci* Fh. Toronto, Ont., July 16, 1906, (Walker).
1646. *Telamona ampelopsidis* Harr. Toronto, Ont., June 19, 1896, (Walker).

Cicadellidæ.

1795. *Idiocerus lachrymalis* Fh. Toronto, Ont., De Grassi Point, Ont., Aug. 22, 1914, (Walker).
1936. *Acucephalus albifrons* Linn. De Grassi Point, Ont., Aug. 22, 1914, (Walker).
2051. *Deltocephalus configuratus* Uhl. Guelph, Ont., (C. A. Good).
2053. *Deltocephalus sayii* Fitch. Bondville, Que., (Moore).
2181. *Eutettix strobi* Fh. St. Catharines, Ont., June 19, 1914, (Walker).
2228. *Phlepsius irroratus* Say. Toronto, Ont., July 12, 1914, (Walker).
2156. *Athysanus curtisii* Fitch. Bondville, Que., (Moore).
2410. *Empoasca pulchella* G. & B. Pictou, N.S., July 22, 1914, (Walker).

Fulgoridæ.

2545. *Cixius misellus* Van D. De Grassi Point, Ont., Aug. 26, 1914, (Walker).
2673. *Lamenia obscura* Ball. De Grassi Point, Ont., Aug. 24, 1914, (Walker).

Chermidæ.

2822a. *Aphalara veaziei metzaria* Crawf. Pictou, N.S., July 22, 1914, (Walker).
2936. *Psyllia floccosa* Patch. Pictou, N.S., July 22, 1914, (Walker).

Orthoptera.

Acridiidæ.

Nomotettix cristatus Scudd. Truro, N.S., (record from W. H. Brittain).

Locustidæ.

Ceutophilus neglectus Scudd. Black Rock, N.S., (record from W. H. (Brittain).

Orchelimum gladiator Brun. Napinka, Man., Sept. 6, 7, 1916, (N. Criddle). Second Manitoba record. This is the species which was redescribed by E. M. Walker as *Orchelimum manitobense*. The latter name has been placed in the synonomy by Rehn and Hebard (Trans. Amer. Ent. Soc., XLI, 44). Recorded from Ontario in 1914, Ent. Record.

Odonata.

(Arranged according to Muttkowski's Catalogue of the Odonata of North America. The numbers refer to the pages of the catalogue.)

Coenagrionidæ.

Coenagrion angulatum E. M. Walker. Red Deer, Alta., July 5-21; Innisfail, Alta., July 6. New to Alberta list, (Whitehouse).

Libellulidæ.

128. *Cordulia shurtleffi* Scudd. Red Deer, Alta., June 6-July 5. New to Alberta list, (Whitehouse).
139. *Libellula quadrimaculata* Linn. Red Deer, Alta., June 8-Aug. 6. New to Alberta list, (Whitehouse).
161. *Sympetrum costiferum* Hagen. Red Deer, Alta., Aug. 5-Sept. 30. New to Alberta list, (Whitehouse).
166. *Leucorrhinia borealis* Hagen. Red Deer, Alta., nymph (with teneral), June 18, previously unknown, (Whitehouse).
166. *Leucorrhinia glacialis* Hagen. Red Deer, Alta., July 5. New to Alberta list, (Whitehouse).
167. *Leucorrhinia intacta* Hagen. Red Deer, Alta., June 24-July 20. New to Alberta list, (Whitehouse).
167. *Leucorrhinia proxima* Calvert. Red Deer, Alta., June 17-July 23: New to Alberta list; also the nymph, June 17, previously unknown, (Whitehouse).

THYSANURA.

These insects have, as yet, received but scant attention in Canada. Mr. Chas. Macnamara, of Arnprior, Ont., is keenly interested in the Collembola, and in addition to *Istoma nigra* MacG., mentioned in the 1913 record, he has found on the snow at Arnprior, the following species:

Isotoma palustris Müller. Dec. and Jan.
Isotoma viridis riparia Nicolet. March.
Entomobrya multifasciata Tull. Dec.
Tomocerus flavescens americanus Schött. Dec.
Achorutes socialis Uzel. All winter.
Achorutes armatus Nicolet. Dec.

In a paper entitled "North American Collembolous Insects of the Subfamilies Achorutinæ, Neanurinæ and Podurinæ," by Dr. J. W. Folsom, the following species from Canada is described:

* *Achorutes pseudarmatus* Folsom. Kaslo, B.C., (Cockle); Proc. U.S.N.M., Vol. 50, p. 490.

SIPHONAPTERA.

The following species were determined by the Hon. N. Charles Rothschild:
Ceratophyllus arctomys Baker. Perce, Que., from ground hog, June 19, 1915, (Taverner).
Ceratophyllus bruneri Baker. Aweme, Man., Jan. 15, 1914, from *Taxidea taxus*, (S. Criddle).
Ceratophyllus agilis Roths. Aweme, Man., Feb., 1915, from *Mustela cicognanii*, (S. Criddle).
Ctenocephalus canis. Ottawa, Ont., Oct. 27, 1915, (Hewitt).
Leptopsylla hygini Roths. Aweme, Man., Feb., 1915, from *Mustela cicognanii*, (S. Criddle).

Araneida.

(Arranged according to Banks' Catalogue of Nearctic Spiders, U.S.N.M., Bull. 72. The numbers refer to the pages in the catalogue.)

During the past year Mr. J. H. Emerton, of Boston, has examined many spiders collected in Canada. The collection at the University of Toronto, largely the work of Prof. E. M. Walker and Mr. T. B. Kurata, was studied. This collection contains 110 species from widely separated localities. Collections made at Toronto by Mrs. A. B. Faull and from the Thousand Islands by Miss H. Coleman were also determined by Mr. Emerton. In June, 1916, Mr. Emerton visited Ottawa and the writer spent many happy hours in his company collecting spiders, etc. While in Ottawa he examined the collection in the Entomological Branch, and identified a number of species. After leaving Ottawa, Mr. Emerton made collections at Montreal and Quebec, south to Sherbrooke and Megantic and northward to Maniwaki, Montford and Lake St. John, 92 species in all being taken. Mr. F. W. Waugh, of the Geological Survey, Ottawa, collected 46 species at Long Lake, 60 miles east of L. Nipigon and on Manitoulin Island, Lake Huron.

Many of the records given below refer to well known species, but it seems worth while including them here, as the definite localities add to their known range of distribution.

In the Proceedings of the United States National Museum, Vol. 51, pages 67-72 (separates issued Oct. 16, 1916), Nathan Banks published a list of 51 species of spiders collected by Messrs. Currie, Caudell and Dyar, in British Columbia in 1903.

Theraphosidæ.

2. *Brachybothrium pacificum* Simon. Saanich, B.C., (Wilson), Departure Bay, Vanc. Is., 1913, (T. B. Kurata).

Scytodidæ.

5. *Scytodes thoracica* Lat. Toronto, Ont., Sept. 15, 1915, (T. B. Kurata).

Dysderidæ.

7. *Segestria pacifica* Bks. Departure Bay, Vanc. Is., B.C., 1913, (T. B. Kurata).

Drassidæ.

9. *Gnaphosa conspersa* Thor. Lanoraie, Que., June 20, 1915, (Beaulne); Prince Albert, Sask., June 25, 1913, (T. B. Kurata); Departure Bay, Vanc. Is., July 18-28, 1913, (T. B. Kurata).
9. *Gnaphosa parvula* Bks. Prince Albert, Sask., June 25, 1913, (T. B. Kurata); Dauphin, Man., June, 1913, (T. B. Kurata).
9. *Pythonissa imbecilla* Keys. Chelsea, Que., June, 1916, (Gibson).
10. *Drassus neglectus* Keys. Lanoraie, Que., June 14, 1915; Montreal, Que., May 9, 1915, (Beaulne); Orillia, Ont., June 11-16, 1914; Sudbury, Ont., June 17, 1913, (T. B. Kurata); Departure Bay, Vanc. Is., B.C., July 21, 1913, (T. B. Kurata).
10. *Drassades robustus* Emer. Departure Bay, Vanc. Is., B.C., (T. B. Kurata); Banff, Alta., June 29, 1913, (T. B. Kurata).

Clubionidæ.

10. *Micaria gentilis* Banks. Montreal, Que., May 8, 1915, (Beaulne).
11. *Castianeira crocata* Hentz. Lanoraie, Que., June 14, 1915, (Beaulne).
12. *Agrœca pratensis* Emer. Lanoraie, Que., June 21, 1915, (Beaulne).
14. *Clubiona canadensis* Emer. Montreal, Que., May 11, 1915, (Beaulne); Nipigon, Ont., June 18, 1913, (T. B. Kurata); Metlakatla, B.C., 1912, (J. H. Keen); Departure Bay, B.C., (T. B. Kurata); Dauphin, Man., June 21, 1913, (T. B. Kurata).
14. *Clubiona riparia* Koch. Toronto, Ont., (T. B. Kurata).

Agelenidæ.

15. *Cicurina simplex* Simon. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
15. *Cicurina tersa* Simon. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
16. *Cœlotes montanus* Emer. Orillia, Ont., April 27, 1914; Toronto, Ont., May 8, 1914, (T. B. Kurata).
16. *Agelena pacifica* Banks. Saanich, B.C., (Wilson).

Dictynidæ.

17. *Dictyna maxima* Bks. Dauphin, Man., June, 1913, (T. B. Kurata).
18. *Amaurobius sylvestris* Emer. Banff, Alta., end June, 1913, (T. B. Kurata); Aylmer, Que., June 5, 1915, (Beaulne); Nipigon, Ont., July, 1894, (W. McInnes); Orillia, Ont., May 24, 1914, (T. B. Kurata).
19. *Amaurobius ferox* Walck. Montreal, Que., April 21, 1915, (Beaulne).
19. *Amaurobius severus* Simon. Departure Bay, Vanc. Is., B.C., July 5, 1913, (T. B. Kurata).

Theridiidæ.

19. *Theridium murarium* Emer. Prince Albert, Sask., June 25, 1913, (T. B. Kurata).
20. *Theridium zelotypum* Emer. Manitoulin Island, (F. W. Waugh); Nipigon, Ont., June 18, 1913, (T. B. Kurata); Ottawa, Ont., June, 1916, (J. H. Emerton); Meach Lake, Que., Hull, Que., (Emerton and Gibson).
21. *Lithyphantes corollatus* L. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
21. *Enoplognatha mormorata* Hentz. Departure Bay, Vanc. Is., B.C., (T. B. (Kurata); Prince Albert, Sask., June 25, 1913, (T. B. Kurata).
21. *Crustulina borealis* Bks. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
21. *Crustulina guttata* Reuss. Montreal, Que., May 6, 1915, (Beaulne); Ahuntsic, Que., June 4, 1915, (Beaulne).
22. *Asagena americana* Emer. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
23. *Lathrodectes mactans* Fab. Nipigon, Ont., July, 1894, (W. McInnis); Departure Bay, Vanc. Is., B.C., July 6, 1913, (T. B. Kurata).
27. *Lophocarenum decemoculatum* Emer. Aylmer, Que., June 3, 1915, (Beaulne); Lanoraie, Que., June 25, 1915, (Beaulne).
29. *Grammonota pictilis* Camb. Southern Labrador, 1915, (C. W. Townsend).
31. *Erigone longipalpis* Sund. Metlakatla, B.C., 1912, (Keen).

Linyphiidæ.

32. *Neriene clathrata* Sund. Toronto, Ont., (T. B. Kurata).
32. *Labulla altioculata* Keys. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).

33. *Linyphia diana* Keys. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
33. *Linyphia litigiosa* Keys. Departure Bay, Vanc. Is., B.C., July, (T. B. Kurata).
33. *Linyphia mandibulata* Emer. Prince Albert, Sask., June 25, 1913, (T. B. Kurata).
33. *Linyphia nearctica* Banks. Nipigon, Ont., (F. W. Waugh). The occurrence of this interesting species at Nipigon extends its range 700 miles further west. It frequents small spruce and balsam trees, (J. H. E.). During Mr. Emerton's visit to Canada in 1916 the species was found at several points in the Ottawa district, (A. G.).
34. *Bathyphantes calcaratus* Emer. Old Romain to Blanc Sablon, Southern Labrador, 1915, (C. W. Townsend).
35. *Bathyphantes subalpina* Emer. Old Romain to Blanc Sablon, Southern Labrador, 1915, (C. W. Townsend).

Tetragnathidæ.

36. *Eucta caudata* Emer. Prince Albert, Sask., (T. B. Kurata).
37. *Tetragnatha vermiformis* Emer. Jordan, Ont., Sept. 24, 1915, (Ross); Toronto, Ont., (T. B. Kurata).
37. *Tetragnatha extensa* Linn. Nipigon, Ont., 1894, (W. McInnis); Hull, Que., June, 1916, (Gibson); Aylmer, Que., June 5, 1915, (Beaulne); Lanoraie, Que., June 24, 1915, (Beaulne).

Epeiridæ.

39. *Zilla montana* Koch. Nipigon, Ont., June 18, 1913, (T. B. Kurata).
41. *Epeira cavatica* Keys. Toronto, Ont., (T. B. Kurata).
42. *Epeira gemma* McCook. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).

Thomisidæ.

48. *Xysticus formosus* Banks. Banff, Alta., end June, (T. B. Kurata); Prince Albert, Sask., June, 1913, (T. B. Kurata).
48. *Xysticus limbatus* Keys. Meach Lake, Que., June 22, 1916, (Gibson); Dauphin, Man., June, 1913, (T. B. Kurata).
51. *Thanatus coloradensis* Keys. Departure Bay, Vanc. Is., B.C., (T. B (Kurata).
51. *Tibellus oblongus* Walck. Spruce Brook, Nfd., July 26, 1914, (Walker); Okanagan Landing, B.C., Aug. 15, 1913, (T. B. Kurata); Prince Albert, Sask., June, 1913, (T. B. Kurata).
52. *Philodromus inquisitor* Thor. Southern Labrador, 1915, (C. W. Townsend).

Pisauridæ.

53. *Dolomedes idoneus* Mont. Chelsea, Que., May, 1913, (Gibson); De Grassi Point, Ont., Aug. 26, 1911, (Walker).

Lycosidæ.

55. *Lycosa albohastata* Emer. North Devon Island, Hudson Bay, Aug. 13, 1904, (A. Halkett).
55. *Lycosa beani* Emer. Southern Labrador, 1915, (C. W. Townsend).

57. *Geolycosa missouriensis* Banks. Aweme, Man., (J. Fletcher). Burrows in sand and occurs along the Great Lakes and south as far as Texas, (J. H. E.).
58. *Pardosa atra* Bks. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
58. *Pardosa diffusa* Emer. Southern Labrador, 1915, (C. W. Townsend); Aylmer, Que., June 5, 1915, (Beaulne); Toronto, Ont., (T. B. Kurata); Fort William, Ont., June 19, 1913, (T. B. Kurata); Banff, Alta., end June, (T. B. Kurata).
59. *Pardosa groenlandica* Thor. Klutlan Glacier, 9,000 feet, June, 1893, (F. H. Lambert); Jasper Park, Alta., Sept. 1, 1915, (Hewitt); District of Mackenzie along the south shore of Great Slave Lake, Aug. 22, 1914, (F. Harper); Departure Bay, B.C., (T. B. Kurata); Prince Albert, Sask., June 25, 1913, (T. B. Kurata).
59. *Pardosa lapidicina* Emer. St. Johns, Que., March 23; Vaudreuil, Que., May 27; Lanoraie, Que., June 24, 1915, (Beaulne); Toronto, Ont., Oct. 4, 1913, (T. B. Kurata).
59. *Pardosa glacialis* Thor. District of Mackenzie along the south shore of Great Slave Lake, Aug. 22, 1914, (F. Harper); Toronto, Ont., May 8, 1914, (T. B. Kurata); Prince Albert, Sask., June 25, 1913, (T. B. Kurata).
59. *Pardosa uncata* Thor. Departure Bay, Vanc. Is., B.C., (T. B. Kurata); Dauphin, Man., June, 1913, (T. B. Kurata); Banff, Alta., end June, 1913, (T. B. Kurata).
61. *Pirata insularis* Em. Toronto Island, Ont., June 10, 1914, (T. B. Kurata).

Attidæ.

62. *Phidippus alborittatus* Koch. Chelsea, Que., June, 1916, (Gibson).
64. *Phidippus johnsoni* Peck. Departure Bay, Vanc. Is., B.C., Aug. 1, 1913, (T. B. Kurata).
66. *Dendryphantes flavipedes* Peck. Prince Albert, Sask., June, 1913, (T. B. Kurata).
66. *Dendryphantes militaris* Hentz. Mr. Emerton informs me that Prof. W. H. Brittain, of Truro, N.S., has sent to him specimens of this familiar spider which has several times been seen eating the adults of the Apple Maggot.
68. *Pellenes oregonensis* Peck. Departure Bay, Vanc. Is., B.C., (T. B. Kurata).
70. *Sittacus ranieri* Peck. Banff, Alta., June 28, 1913, (T. B. Kurata).
71. *Icius hartii* Emer. Lanoraie, Que., June 21, 1915; Aylmer, Que., June 5, 1915, (Beaulne).

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ANNUAL REPORTS

OF THE

DAIRYMEN'S ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1916

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1917

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TORONTO

To His Honour SIR JOHN STRATHEARNE HENDRIE, C.V.O., a Lieutenant-Colonel in the Militia of Canada, etc., etc., etc.

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned begs to present for the consideration of Your Honour the Report of the Dairymen's Association of Eastern Ontario for 1916 and the Report of the Dairymen's Association of Western Ontario for 1916.

Respectfully submitted,

W. H. HEARST,

Minister of Agriculture.

Toronto, 1917.

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DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO

OFFICERS FOR 1917.

Honorary President.—JOHN R. DARGAVEL, M.L.A., Elgin.
President.—J. N. STONE, Norham, Ont.
First Vice-President.—R. G. LEGGATT, Newboro, Ont.
Second Vice-President.—JOS. MCGRATH, Mt. Chesney, Ont.
Secretary.—T. A. THOMPSON, Almonte, Ont.
Treasurer.—JAS. R. ANDERSON, Mountain View, Ont.

DIRECTORS:

Ontario, Victoria, and Haliburton	HY. GLENDENNING, Manila.
Northumberland	J. N. STONE, Norham.
Renfrew	J. B. FERGUSON, Renfrew.
Lanark	JOHN STEEL, Almonte.
Carleton	E. H. GRAHAM, Carp.
Glengarry	A. J. ROBERTS, Martintown.
Prescott	N. FRASER, Vankleek Hill.
Russell	W. H. OLMSTEAD, Bearbrook.
Stormont	WM. BROWN, Dickinson's Landing.
Dundas	GEORGE SMITH, Iroquois.
Grenville	JAMES SANDERSON, Oxford Station.
Leeds	R. G. LEGGETT, Newboro.
Frontenac	JAS. MCGRATH, Mt. Chesney.
Lennox and Addington	M. N. EMPEY, Napanee.
Prince Edward	W. A. BENSON, Picton.
S. Hastings	F. MALLORY, Frankford.
N. Hastings	T. H. THOMPSON, Madoc.

G. G. PUBLOW, Chief Dairy Instructor, Kingston.
L. A. ZUFELT, Superintendent, Eastern Dairy School, Kingston.
Auditor: J. J. PAYNE, Brinston, Ont.
Representative to the Canadian National Exhibition: HENRY GLENDENNING, Manila.

FINANCIAL STATEMENT FOR 1916.

RECEIPTS.		EXPENDITURES.	
Jan. 3. Cash on hand from previous year	$348 06	Renfrew pay sheet for Directors	$239 95
Jan. 5. For members' fees	93 00	Pay sheet No. 2, Kingston	49 70
Jan. 29. Renfrew Town and County grants	300 00	Pay sheet No. 3, Toronto	182 25
Mar. 18. Legislative grant	2,500 00	Prosecutors' expenses and salaries	532 65
Mar. 23. Receipts from programme advt	250 75	Lecturers' expenses	458 50
Money received from prosecutions	877 50	Advertising and printing	349 52
Interest from Molsons Bank	42 22	Rural Publishing Co. for subs. *Farm and Dairy*	70 00
		District meeting expenses	342 80
		Stationery, stamps, telephone and express	75 73
		Officers' salaries	600 00
		Official stenographer	90 00
		Total payments	$2,991 10
		Balance on hand Jan. 3rd, 1917	1,420 43
	$4,411 53		$4,411 53

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO

OFFICERS FOR 1917.

President.—R. W. STRATTON, Guelph, Ont.
First Vice-President.—JAS. DONALDSON, Atwood, Ont.
Second Vice-President.—FRANK BOYES, Dorchester, Ont.
Third Vice-President.—G. F. MAHON, Woodstock, Ont.
Secretary-Treasurer.—FRANK HERNS, London, Ontario.

Directors:

J. N. PAGET, Canboro.
T. BALLANTYNE, Stratford.
ROBERT MYRICK, Springford.
GEO. E. BOOTH, Ingersoll.
W. G. MEDD, Winchelsea.
JOHN SCOTT, Woodstock.

Auditors: J. A. NELLES, London; J. C. HEGLER, K.C., Ingersoll.

Representatives:

Canadian National Exhibition, Toronto: FRANK HERNS, London; ROBERT JOHNSTON, Woodstock.
Western Fair, London: FRANK HERNS, London; JOHN BRODIE, Mapleton.

FINANCIAL STATEMENT FOR 1916.

RECEIPTS.

Cash on hand from previous year	$271 46
Members' fees, 269 at $1.00	269 00
Legislative grant	2,000 00
Money received from prosecutions	892 00
Donation for special prizes	50 00
Sale of dairy exhibits	2,568 73
Advertising in Convention programme	190 00
Sale of experimental butter	19 60
Total	$6,260 79

EXPENDITURES.

Cash paid for prizes: cheese and butter, $317.00; Canadian Salt Co., special, $50.00	$367 00
Expenses for Convention	92 49
Stenographer's salary, $379.00; Directors' expenses, $113.65	492 65
Postage and stationery, $176.00; printing, $327.53; advertising, $121.70	625 23
Judges' fees and expenses	48 45
Lecturer's expenses	15 50
Prosecutor's salary, $330.14; expenses, $115.45	445 59
Periodicals for members	194 10
Cost of reporting	60 00
Purchase of dairy exhibits	2,568 73
Office expenses, light, cleaning and sundries	180 36
Office rent, $120.00; office furniture, $2.50	122 50
Telegrams and telephone, $64.49; express and cold storage charges, $33.28	97 77
Half fine paid to factories	446 00
Auditor's fees	13 00
Exhibition butter lost in transit, $17.78; purchase of experimental cheese, O. A. C., $2.50	20 28
Interest on overdraft	1 30
Total	$5,790 95
Balance	469 84
	$6,260 79

Dairymen's Association of Eastern Ontario

The Fortieth Annual Convention of the Dairymen's Association of Eastern Ontario, was held in the Armories, Napanee, on the 4th and 5th of January, 1917.

J. N. Stone, Norham, President of the Association, occupied the Chair.

PRESIDENT'S ADDRESS.

J. N. Stone, Norham.

I am sure that we as dairymen have reason to congratulate ourselves on being able to secure this magnificent building in which to hold our convention. I am sure you will join with me in giving our thanks to the committee and to the Department of Militia for giving us this privilege.

It is with pleasure that I welcome you to the 40th Annual Convention of the Dairymen's Association of Eastern Ontario, and doubly pleased as it is the first Convention of dairymen ever held in this prosperous Town of Napanee, situated as it is in the midst of a wealthy dairy district.

While it is a pleasure to welcome you to this Convention, I cannot proceed farther without paying the highest tribute to the memory of those who have departed this life since we last met, in the persons of Senator Derbyshire, the Hon. James S. Duff, Minister of Agriculture for Ontario, and Mr. T. G. Wright, Director for Prince Edward District.

Their absence has already been felt, we shall miss them at our Convention, their upright character, sterling qualities, and manly spirit were recognized and admired by all who knew them, and their work and achievement will ever be remembered by the dairymen of Ontario.

I am pleased to extend the thanks of this association to both Federal and Provincial Departments of Agriculture, for the able assistance they have given the Dairy Industry of this Province.

Mr. G. G. Publow, Chief Dairy Instructor, has been carrying on experimental work along the lines of the new Dairy Act. His results have been placed before the dairymen at the district dairy meetings.

The new Act will be brought up for discussion at one of the sessions, and I hope every person interested will feel free to take part. I would advise that this Convention express its opinion regarding the importation of oleomargarine, this, I consider, would be a serious set back to the dairy industry, and should be opposed strongly.

In conclusion, the prosecution of the war to a successful issue is still the dominating influence. We are well into the third year of the war with increasing bitterness on both sides. We are sacrificing the best blood of our country side by side with the heroes of Great Britain, and her Allies, therefore we must continue to the end, exerting in every way our utmost to provide the men and the means necessary to enable Canada "to do her bit" towards freeing the world from German militarism, and everything that phrase implies.

JUDGE'S REPORT.

GEORGE H. BARR, CHIEF OF DAIRY DEPARTMENT, OTTAWA.

I wish to congratulate the cheese makers of Eastern Ontario on the splendid exhibit that they have been able to put up at this Convention. I was one of the judges at the first exhibit you had, when the Convention was held at Cornwall, and if I were to compare this exhibit with that one I would say that this was ten times better in more ways than one. At Cornwall we found very few cheese that were properly finished. It is the exception to find a poorly finished cheese at this exhibit. The size and finish of the cheese here are exceptionally good. Just one word to some of the exhibitors whose cheese were scored down on account of finish. One of the cheese that I considered about the finest was put out of the running on account of the finish, and it served that exhibitor right, because that was a matter of downright carelessness on his part. One of the things you want to be careful about in exhibiting cheese is not to leave them unfinished, because a point or two will decide whether you get the cup or not, when the scoring is so very close as it has been at this exhibit. I would suggest that you throw away the old fibre rings and get steel followers, and then you will have no trouble in having the finest finish on your cheese. You have come so close to the beautiful exhibit that they put up at the Western Ontario Convention every year, that I do not know whether you are behind it or not. They have been at it longer in the West than you have, and they certainly do put up a splendid exhibit of cheese.

The only fault I could find in the quality was that it was so good that I had difficulty in judging. I do not like judging under conditions like that, because it gives one a feeling of extra responsibility. I do not think there are six cheese in the hall that I would consider badly made. I can only remember one cheese that showed a little gasiness. They were mostly all close boring, and the texture was good. There were a few that were a little lumpy. When I score a cheese 29 it is pretty near all right. I do not know why I take off that one point, but I suppose I do not want to give full value, but when they score 29 they are pretty good cheese.

I can only remember six or seven cheese that were any way off in flavor, that is out of 181 cheese. I think this exhibit should be continued next year, because it helps to stimulate the makers to put up a fine quality of cheese. I would not say that because a maker takes the trophy at this exhibit that he is the best maker in Eastern Ontario, but it shows that he can make good cheese. I think it would be a good thing if we could get all the makers of cheese in Eastern Ontario to attend the Convention.

We have a few cheese at the back of the hall made with pepsin rennet, and we are going to cut them up so that you may have an opportunity of judging as to their merits.

MR. T. O. THOMPSON: I can fully support all that Mr. Barr has said with reference to the exhibit.

I want to congratulate the makers on the interest they have taken and on the high quality of the cheese exhibited. I gave some cheese full value in finish, and I would like that every cheesemaker in Eastern Ontario could see how these cheese are finished. They are a great credit to the men who did the work on them.

REPORT ON BUTTER EXHIBIT.

L. A. Zufelt, Superintendent Eastern Ontario School, Kingston.

There is very little for me to say regarding the butter exhibit. I regret very much the smallness of the exhibit. I cannot understand why our buttermakers do not take advantage of the opportunity of exhibiting at this Convention. I think we should do something to improve the condition of the butter made in the Province of Ontario.

PRIZE WINNERS, 1917.

Cheese.

Class 1—Sec. 1, September White.

1. A. G. Wiltsie, Vankleek Hill.
2. Leith Talman, Elgin.
3. J. W. Fretwell, Oxford Mills.
4. J. S. Tobin, Martintown.
5. Orrie E. Barton, Springbrook.
6. C. A. Wilkins, Mille Roche.
7. Geo. H. Rose, Sterling.

Class 1—Sec. 2, September Colored.

1. Jas. S. Tobin, Martintown.
2. Ralph Alguire, Northfield.
3. W. O. Wort, Avonmore.
4. John Grant, Lunenburgh.
5. E. E. Chaffee, Cornwall.
6. Alex. McMillan, Avonmore.
7. John Hall, Rossmore.

Class 2—Sec. 1, October White.

1. Orrie E. Barton, Springbrook.
2. Geo. H. Rose, Sterling.
3. Jas. F. King, Almonte.
4. John H. Kyle, Navan.
5. Geo. W. Chambers, Sterling.
6. Walter T. Barker, Sterling.
7. Jas. S. Tobin, Martintown.

Class 2—Sec. 2, October Colored.

1. A. G. Wiltsie, Vankleek Hill.
2. Jas. S. Tobin, Martintown.
3. Kenny Dewar, Vars.
4. J. W. Fretwell, Oxford Mills.
5. Ralph Alguire, Northfield.
6. Percy Foxton, Sydenham.
7. John Kyle, Navan.

Class 3—Sec. 1, Canadian Flats.

1. John Hall, Rossmore.
2. Ralph Alguire, Northfield.
3. W. J. Potter, Moulinette.
4. Benson Avery, Kinburn.

Class 3—Sec. 2, Stilton.

1. W. J. Potter, Moulinette.
2. Chas. A. Wilkins, Mille Roche.
3. W. J. Jerow, Napanee.
4. Walter T. Barker, Sterling.

BUTTER.

Creamery Butter.

Class 4—Sec. 1, 56 Pound Box.

1. Belleville Creamery.
2. E. E. Chaffee, Cornwall.
3. R. S. Southworth, Campbellford.

Class 4—Sec. 2, 21 Pound Prints.

1. R. M. Haley, Lanark.
2. Belleville Creamery.
3. E. E. Chaffee, Cornwall.
4. R. S. Southworth, Campbellford.

DAIRY BUTTER.

Class 5—Sec. 1, 20 Pound Crock.

1. M. H. Sexsmith, Selby.
2. Jos. Cramer, Westbrook.
3. Miss N. P. McDonald, Campbellford.
4. D. H. Fraser, Northport.

Class 5—Sec. 2, 10 Pound Prints.

1. Jos. Cramer, Westbrook.
2. M. H. Sexsmith, Selby.
3. Miss N. P. McDonald, Campbellford.
4. D. H. Fraser, Northport.

SPECIAL PRIZES.

Canadian Salt Co., Specials.

1. John Hall, Rossmore.
2. Ralph Alguire, Northfield.
3. W. J. Potter, Moulinette.
4. C. A. Wilkins, Mille Roche.
5. M. H. Sexsmith, Selby.
6. Jos Cramer, Westbrook.

Silver Trophy by Instructors and Cheesemakers.

1. Jas. S. Tobin, Martintown.
2. J. Buro, Mille Roche.

Verrett, Stewart & Co., Specials.

1. G. H. Barker, Vankleek Hill.
2. W. G. Gardiner, Kemptville.

Western Salt Co., Specials.

1. A. G. Wiltsie, Vankleek Hill.
2. A. G. Wiltsie, Vankleek Hill.
3. Belleville Creamery.
4. R. M. Haley, Lanark.

The W. C. Coo, Special.

Miss N. P. McDonald.

De Laval Dairy Supply Co., Specials.

1. Orrie E. Barton, Springbrook.
2. J. S. Tobin, Martintown.
3. J. S. Tobin, Martintown.
4. Jos. Cramer, Westbrook.
5. Belleville Creamery.

The J. B. Ford Specials.

1. Orrie E. Barton, Springbrook.
2. J. S. Tobin, Martintown.
3. M. H. Sexsmith, Selby.
4. Jos. Cramer, Westbrook.

The C. Richardson & Co., Specials.

1. E. E. Chaffee, Cornwall.
2. E. E. Chaffee, Cornwall.

The W. A. Drummond & Co., Specials.

1. Belleville Creamery.

COMMITTEES.

RESOLUTIONS.—J. A. Sanderson, R. G. Leggatt, Joseph McGrath, J. A. Campbell, W. H. Olmstead, T. H. Thompson, J. S. Caldwell, J. A. Kerr and A. J. Robertson.

NOMINATING COMMITTEE.—Hy. Glendenning, Neil Fraser, Wm. Brown, John Steele, T. A. Thompson, G. A. Gillespie and J. B. Ferguson.

MILKING MACHINES AND GENERAL DAIRYING.

GEORGE ROTHWELL, ASSISTANT SUPERINTENDENT, ANIMAL HUSBANDRY BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA.

We live in times that are going to make history. History is being made rather hard for the dairy farmer. The Dairy Commissioners Branch at Ottawa has been acting as a publicity agent for the dairy cow. At this particular time it would appear that in view of the extreme scarcity of labor and the high prices for food that the men who have been attending to average cows have come to the conclusion that the fewer cows of that class he keeps the better off he will be. At Ottawa we are trying to foster the spirit of eliminating from the dairy herds all animals that are not working on a paying basis. We must all remember that if we have not got good dairy cows, and if we do not pay attention to the good cows that we have, which is the first step in the dairy business, then everything else in connection with the business goes by the board.

The first point I want to draw your attention to is the question of saving labor in the dairy business, and of the great saving that may be made in the cost of production both in labor and food by keeping fewer and better cows.

If Mr. Grisdale had been able to be with you this afternoon he intended to address you on crop rotation. It seems to me that if the dairy farmer is going to make a profit he must be very wide awake. He must not content himself with being a dairyman. I know several dairy farmers, and some of them Holstein breeders, and if they were half as good farmers as they are breeders they would be very big men indeed. They seem to pay a great deal more attention to the breeding and feeding of dairy cattle, and not half enough attention to their farms. The good dairy farmer must be a good farmer as well as a dairyman. We can save largely in the feed account by a proper appreciation of home-grown feeds. With meal feeds double and treble in value, the feeding of the dairy cow is a difficult problem. The farmer who knows the difference between good clover hay and bad clover hay, and good and bad ensilage is in a position to save money.

It seems to me that the dairy farmer of to-day must be a specialist in four things. He must be a cow specialist, he must be a feed specialist, he must be a corn specialist, and he must be a clover specialist. If he is a specialist in all these four things he is a good farmer, and the good farmer understands the value of rotation of crops. The farmer who is more interested in summer dairying, and who does not seek to produce much milk in winter is apt to say, "I am not interested in the price of meal, my milk is produced during the summer." But very often his cows are kept in such a way during the winter that it takes them six weeks in the spring to pick up to where they can produce in a profitable way in the spring. The summer dairyman who wishes to carry his cattle through the winter at the minimum cost, should pay particular attention to this question of clover hay and good ensilage.

There are many other questions and many other labor saving conditions and devices that are appealing to the dairymen and have appealed to them during the past eight or ten years.

One labor saving device that has been taken up by the dairymen of Canada is the milking machine. At Ottawa we have fairly large herds, and we have

facilities for testing these different devices. We purchase these machines and there is no string tied to them in any way, and we feel that we are at liberty to say just what we like about them. I have not time to-day to enter into the involved question of the milking machine. We have tested six different makes of milking machines, and three or four of them have appealed to us. In a general way I am able to say, that the milking machine of to-day is an entirely feasible piece of mechanism, that they will do the work they were designed to do, and that they will save labor. They are sold on the market, not exactly under false pretences, but without giving the purchaser an exact insight into what the machine means, and the care that must be taken of it, the result being that a great many milking machines have been discarded by much-disgusted owners, for the simple reason that they did not properly understand the machine, and that misunderstanding was because the agent who sold the machine did not properly explain the working of it. We have found that when the machines are properly taken care of and properly handled, they will save a great deal of labor, and the whole question of the successful operation of a milking machine depends on the man who is using it. We are in touch with all experimental work on the subject, and we are also in touch with a very large percentage of the dairymen in Ontario and Quebec who are using the machines, and we get reports from them. The opinion seems to be that the work depends to a large measure on the man who is using the machine. Men who understand the machine are getting good results and are in favor of the machine. My advice is that if any of you are contemplating the use of a milking machine to first make sure that you understand the machine. You must understand that you are buying something that is rather complicated and requires a great deal more attention than a cream separator. Remember that a milking machine will not make as clean milking as good hand milking. Remember that it is up to the man who makes the purchase to make a success of the milking machine. I look for great advancement in the use of the milking machine in the next few years. The milking machine of twenty-five years ago was more or less of a joke. The milking machine of five years ago had a great many defects. The milking machine of to-day is nearly mechanically perfect. There are a few small things that have to be perfected, but I think in a few years we will have a first-class machine that we can count upon, just the same as we count upon the binder and the manure spreader and other farm implements. We hope in the near future to issue a bulletin dealing with our tests of the milking machine.

There are one or two features of the dairy business that are not being dealt with as they should. We have all had more or less experience with tuberculosis and abortion by dairy cows. Both these diseases have been prevalent for years, although the one last mentioned has come into prominence during the past few years. Although we have had some of the best scientists of the world trying to find a cure for abortion, nothing of a practical nature has been brought forward, and you all realize that it is one of the great evils of the dairy business. Work will be carried on in regard to both these diseases, but as yet we have no sure cure.

Q.—What solution do you use for cleaning the milking machine?

A.—There are several solutions that might be used. There is the alkaline solution and the saline or salt solution. We have been using chlorine or lime solution, and we have had excellent results.

Q.—Have you satisfied yourself that you get as much milk from the cows by using the milking machine as by hand milking?

A.—We have found that the milking machine handled as we have been able to handle it, to the very best of our ability, has some slight effect in lessening the amount of milk produced by the cow. I do not think you will find any man who has a cow on record performance work or on short test work who would leave that cow to the tender mercies of the milking machine. It is claimed that the amount of milk that is lost is more than made up by the amount of labor that is saved. We cannot see that the milking machine has any harmful influence on the cow if properly handled. As a measure of precaution we strip our cows after using the milking machine. Some individual cows milk out dry with the milking machine, and with others it is often necessary to take a considerable quantity of milk away. Taking them on the average, the milking machine will milk almost as clean as hand milking.

Q.—Does the milking machine give as good results in cold weather as in warm weather?

A.—That depends on in what way you are looking for good results. You can make much cleaner milking in cold weather with the milking machine. We can see no difference in any other way in the practical results.

Mr. Hy. Glendenning: Why didn't you include alfalfa in your list of feeds for the dairy cow?

A.—I was speaking generally, and I had hoped that clover would include alfalfa.

Q.—Supposing you have a valuable cow and she aborts once or twice, what is best to be done; will she keep it up or is there any cure?

A.—If the abortion is due to contagious abortion, she will generally abort three times and then she will be immune. But although she will not abort herself she will spread the disease to her neighbor; she will be a carrier of the disease. It is the same with typhoid fever in the human body. In many cases a cow will only abort once, and without any treatment will be able to cleanse herself. At the present time we are carrying on investigation work on this subject at Ottawa. There are cures advertised that may be used, but we have not been able to find anything that is standard. We have tried out the Methelene Blue treatment that was given a great name by one of the United States Experiment Stations, and was reported by them to have acted 94 per cent. sure. We gave it a very thorough test, and we could not secure any such results. At present that particular remedy is out of the question. We used to buy it for $2.75 a pound, and now it is $1.200. A lot of it came from Germany. There are several solutions that show very good results.

FARM MANAGEMENT.

A. Leitch, Ontario Agricultural College, Guelph.

I feel complimented in being asked to address this Convention, because I am an Eastern Ontario Dairyman myself. I was born and raised, and what dairy knowledge I have, was gained in Eastern Ontario. In my comparative short life I have seen material progress made by the dairy farmers in Eastern Ontario. When I was very young there were not the evidences of progress and prosperity in the St. Lawrence Valley that there are to-day. The Dairymen's Association of

Eastern Ontario has been the leading public spirit in helping to elevate the standard of the dairy cow. There was a peculiar set of economic conditions that forced the farmer of Eastern Ontario into the dairy business. This is the oldest settled part of British North America. The land was cleared here first, and it is not the most fertile land in British North America. It was close to the market and had the St. Lawrence River transportation, and the land was cropped intensively and soon became depleted. Then came the time when they could no longer grow grain in competition with the farmers of the West, and they began to realize that the cow was the animal that would yield them a profit, and also help to build up the fertility of the land.

In those days there was plenty of land and abundance of labor and a fairly good market for dairy products. What was produced was produced at a profit, even though the price was not very high. The farms of Eastern Ontario, owing to the fact that dairying has been extensively practiced, are twice as productive as they were twenty-five years ago. Economic conditions have changed, we have built up the land but we have not got the labor, and that has made the cost of raising our crops and keeping the cattle over the winter much higher. We still have our land reasonably cheap, and it is built up and better than it used to be, but our labor is from 200 per cent. to 300 per cent. higher than it was twenty-five years ago. We have an advanced price for our product, but not in keeping with the cost of production, and we still have the average cow. We are beginning to realize that the dairy business in Eastern Ontario has reached a stage where it is not quite as profitable as it should be, and it is costing the farmer nearly as much to produce the article as he gets for it. There are two things to be done. You can try to increase the price that you will get, but that is not for me to take up. The other way of bettering the situation and the one I am going to take up, is by lessening the cost of production. How will we go to work to decrease the cost of the production of milk? The first way, and the one that needs most attention to-day is by the use of better cows. I am not going to touch on that, because it will be dealt with by Mr. Whitley. Another way is by the use of the milking machine, and Mr. Rothwell has handled that to your satisfaction. There is another way of decreasing the cost of producing milk, and that is by the better organization of farm labor. If there is one season in the year where everything seems to conspire to give the cow her character, it is not in the winter time in these days of comfortable buildings. It is not in the spring time when nature provides rich feed. It is in that season of the year commencing from the 1st of July to 10th July and ending up to about the 1st September. That is the time when the heat and the flies and the high cost of labor and the rush of work on the farm all conspire to give the cow her character. It is just at that time when she is doing her best and should be producing her milk the cheapest that everything seems to conspire against her. Nobody will deny that if a cow drops off in her milk supply at that time, you cannot bring her back to the same capacity of milk supply that she would be in if you had fed her up so that she would keep up the normal supply.

No matter how well you feed them they will never come back to where they normally would have been had they been supplied with feed at the proper time. You say that opens up the question of more labor, and that is the time of year when labor is the most valuable, and when labor is returning the greatest profits to a farmer than at any other time of the year—in the haying and harvesting season. Two years' figures on the cost account, figuring what labor actually does

cost and what it brings in at the College Farm for two years, and one year's figures from other farms throughout the Province, show that in producing clover hay at $12 a ton, after paying all other expenses, rental, horse labor, and machinery labor, a man working in the hay field was earning from 64 cents to 74 cents an hour—that is if you pay a man all his work is worth. You can pay him from 64 cents to 74 cents an hour and still keep the cost of your hay below $12 a ton. You may only be paying 25 cents an hour, but that is what the man is worth. Some other crops do not yield as large returns for the hours of labor as a hay crop. Oats, for instance, run from 22 cents to 28 cents an hour; barley and wheat a little over 30 cents an hour; mangels from 30 cents to 40 cents an hour. That is what the man labor is really worth at that critical time of the year.

I said a few moments ago that you should so feed the cow at this critical time of the year that she will keep from dropping in her milk supply, and you say to me that is when labor is the most valuable. There are two or three methods of keeping up the cow's milk during this time, and each one of them is better than letting the cow go down. The first one is by the soiling method, that is the growing of some green crops or a succession of green crops and feeding that to the cow to supplement the pasture, and that is better than letting the cow drop off in her milk supply, but that entails too much labor. There is another method that is a little better still, and that is that the farmer should put in, when he is planting his corn crop, sufficient corn to have more silage than what he will use up during the winter. That also entails labor, but it is cheaper than the other because the crop is harvested and in the silo. Unfortunately neither of these methods can be applied in a business manner at the present time without labor, and labor can hardly be got at all.

There is a better way and a cheaper way. There is the combination of feed that can be compared with any of our grasses or cereal crops. The question is how are we going to overcome this drying up of the grasses or cereal crops? You cannot overcome it with grass. The average grass, seeded the year before, will dry up in the summer time; even the hay crop will dry up in the summer time in spite of all you can do. Fortunately the spring grown crops do not dry up during the summer like hay or pasture grass. There are two very good pasture mixtures for providing the cows with summer feeding, and the cow can go and gather them herself. You have all had recommended to you a mixture of oats, sugar cane and red clover, and it has been highly successful in the hands of many farmers, and has been tried out by many farmers in the Province. This is sown at the same time as you sow your spring grain, or just after you sow your spring grain, and the mixture consists of a bushel and a half of oats, 30 pounds of sugar cane and six or seven pounds of red clover. By the third week in June, when the natural pastures are beginning to fall off, you will have a green crop seven or eight inches high, and the theory is that after the oats are eaten off, the sugar cane covers the land fairly well and provides for a couple of weeks' feed, and after that the red clover provides them with feed for the rest of the season. In soils that are warm and fairly well drained, this mixture is a success. There is a better mixture under all conditions of soil throughout the Province of Ontario, and it happens that the seed for this mixture is in the hands of every farmer in Ontario, and he can get it out of his own granary. The mixture is a bushel of oats, a bushel of barley and a bushel of wheat, spring wheat preferred, and six or seven pounds of red clover per acre. It is a pretty thick sowing, but that is where the success of the mixture comes in. It forms a mat on the ground, and that is one

point in which it is superior to the first mixture. It is always green, and the ground is always covered. With the other mixture, if the sugar cane does not come on, the pasture will dry up, but this last mixture I have given you forms a mat all over the ground, and we have used that mixture for the last four years; and for the last two years I have been in a position to find out in dollars and cents just the value of that mixture. It takes some extra land, I will admit, but land is the cheapest commodity that the farmer uses to-day in Ontario.

A number of farmers in Ontario are trying to compete, with their high labor, small fields, small machinery and not too favorable soil, with the West and middle West, where they have large fields and fertile soil, and can use large machinery, and it would pay the farmer a great deal better to sow half an acre or an acre per cow of this spring pasture to supplement their ordinary pasture, and by doing that they would need to devote a less amount of land to ordinary pasture, and they would get a bigger revenue. You will get a bigger revenue from land sown in this way per acre from a herd of good cows, than in planting the same land to grain. I will admit it takes a little bit of land, but if you have a pasture that will give you a start in the spring for the first three weeks—and nearly every farmer has that in Ontario—and then if you take some of your other land that you are trying to grow oats on at $20 or $24 an acre, and put it into this spring crop that I tell you of, you will find it will pay a great deal better than growing oats, and will yield you twice the revenue, and the old cow will harvest the crop herself and spread manure back on the land. It is one of the best ways I know of for decreasing the cost of the production of milk.

Now, just a word in the way of comparison of how this will pay compared with other crops. We have at the College two herds of dairy cattle. We have one herd that we are compelled to keep inside the year round, and they happen to be extremely good cows It is a herd of tubercular cows, and in order that they should not come in contact with the rest of the herd, we keep them inside. These nine cows are of three different breeds—Ayrshire, Holstein and Shorthorns—and during the year they average over 14,000 pounds of milk and 528 pounds of butter. These are good records. During the summer of 1915 they had dry feed altogether, and during 1916 we fed them soiling crops, and we got big records. We had 35 other cows in pasture, and I picked out nine cows that were milking the same length of time that were feeding outside, and that gave the same percentage of butter fat during the year. I had to leave out some good cows and put in some poor ones in order to make the two herds alike. I got nine that gave a little over 2,000 pounds less milk and 68 pounds of butter fat less per cow. You would think that the cows that gave the 14,000 pounds of milk and 528 pounds of butter fat were the most profitable cows, but they were not. These nine cows fed inside, with the big records, returned $1.72 for each dollar's worth of feed they got during the year. The nine cows that were out in pasture for 4½ months in the year, returned $2.10 for every dollar's worth of feed they got. There was a difference of 40 per cent., and the two herds were handled alike in the winter time; but just because one herd, that were not as good cows, were fed outside and saved labor, they returned 40 per cent. more for each dollar's worth of feed they got, and 40 per cent. on the dollar is some figure, and they saved all of that in four or five months, and that record was on the year's business.

We will compare these cows now with the months that some of these cows were on pasture, and for this purpose took the whole herd outside. The nine good cows that were fed inside during June, July, August and September, pro-

duced milk at a cost of 86 cents per hundred. The cows that were outside, whose average for the whole lot of them would hardly be 10,000 pounds in the year, produced milk for 45 cents per hundred and 11 cents per pound for butter fat for these four months. The cows inside, that were better cows cost so much more for labor, and the harvesting of the feed for these cows made the cost just twice as much as for the cows that were on pasture. The cows outside gathered their own feed, but remember they were charged up with the pasture and for the putting in of the crop. Everything was charged to them, yet they produced milk and butter fat at just half the cost of the cows that were fed inside.

You would like to know how much land it takes to pasture in this way? What an acre will do? You all know how many cows an acre of ordinary natural pasture or even first growth of clover, will handle for the months of July and August. You know that an acre will not provide enough to feed one cow. During 1915 we put this mixture of a bushel of oats, a bushel of barley, and a bushel of wheat on a field of 36 acres. In addition to that we had 30 acres of three-year old timothy sod. That was the pasture we used. We had 66 acres of sod, and the year 1915 was a good pasture year. That 66 acres provided sufficient feed for 72 cattle, of which over 40 of them were mature cows, and that pasture was good for practically all the summer, and there was no feed of any description except a little grain fed to these cows. That, you see, is less than one acre per cow, and that carried the cows over the critical period and well on in the season. We had some second growth clover, but we did not need to turn them into it in 1915 until very nearly the 1st of September.

In 1916 we had still more land in pasture; the 36 acres was seeded with permanent pasture. You can seed to clover better on a spring pasture than on grain. I have never seen a clover crop fail when seeded on spring pasture. This year on our spring pasture we had an exceptionally good stand of clover, and I have never yet seen a man who used a pasture mixture of this kind who had a failure with his clover crop. The tramping does not seem to do the plants any harm. It is three or four weeks before the pasture is fit to turn cows in, and the clover gets a start and the tramping of the cows seems to form a mulch over the top of the soil, and that is the only way I can account for it. In a spring pasture mixture I have never yet seen a failure of the clover crop.

In 1915 we sowed a pasture mixture for a permanent pasture consisting of two pounds of alfalfa, two pounds of timothy, two pounds of meadow foxtail and two pounds of other grasses and one pound of alsike. That provided us with permanent pasture, and in spite of the fact that that was pastured the year before by heifers right up to the time the snow fell, we had a perfect stand on that pasture this year. It was so perfect that we were afraid, on account of the wet weather, we would not get our cattle in on it in time. In addition to that 36 acres of permanent pasture, we put in 34 acres more of this pasture, and that gave us for this year 70 acres of pasture.

This season was not a good year for pasture after the 1st of July. The weather was hot and dry, and yet we maintained 77 head of cattle on these 70 acres throughout the summer, of which 40 were mature animals. We did not have to buy one pound of grain, and we did not have to haul to our pasture one pound of feed. It was the 16th of September, the day prohibition went into effect, before we started to feed, except from the 25th of August, when we used some second growth clover that came up on some hay land that we had cut earlier, but we used that only in the day time and turned them back at night into this

spring pasture and the permanent pasture. By this means in two years, we have been able to increase our total milk output from practically the same cows kept in the same buildings and with the same help, nearly 30 per cent., and we have saved from 40 to 60 acres of pasture land, because every year previous to that we had to take some of our hay land for pasture purposes. That is what we have been able to do on a farm of 500 acres, carrying from 120 to 150 head of cattle. I want to make it clear there is no better use a dairy farmer in Western Ontario can put some of his land to in the spring, than in growing spring crops.

Just a word as to how to make the best yield from a dairy farm. There is one point in which our Ontario farmers are not making the best use of their hay and pasture crops. In these times when labor is scarce and expensive, there is no crop that will yield more returns for the money invested in land and labor than the hay crop. I want to give you some figures for 1915. The clover crop on the College farm averaged 1.14-15 tons per acre. Counting horse labor, man labor, feed of the horses in the winter and everything the same as we would for any other crop, the total cost for land and all labor for storing that crop of hay in the building, after charging for interest on the storage room and everything else, was a little over $7 a ton. That was not a yield of hay to be proud of; it was less than two tons per acre, but if we had had to buy that hay on the market and brought it home and stored it, it would have cost us in 1915 from $12 to $14 per ton. In the same year we grew 106 acres of oats, and they averaged close to 60 bushels per acre, and that is a pretty good yield, and after allowing the same cost as we did for the hay land of rent, man and horse labor, use of machinery, the cost of harvesting and threshing and everything, the oats cost us from 32 cents to 36 cents a bushel. At the time we threshed our oats in October and November, I could have gone on the market and bought just as good oats and stored them at home for 38 cents a bushel, so that we were growing oats at just what it would cost us to buy them, and we had a stock farm with over 140 head of cattle and over 30 head of horses to feed, and although we were only growing a moderate amount of hay per acre, we were growing it for 50 per cent. of what it would have cost. Now, on the face of that, would not it have paid us better to have grown more hay than to have grown 106 acres of oats at 60 cents a bushel, and that is something that every farmer should think of? If you had more hay and more corn silage, you could produce more milk, and that would be a great deal better than growing oats that cost you as much to grow them as you could buy them for. The man who grows oats might have to buy hay, and I can take any herd of cows in Ontario, and no matter how I handle them, I can get more milk than my neighbor who grows oats.

Here we are in Ontario trying to compete with the West, and at this critical time, it behooves every stock man to keep his farm stock and feed as many cattle as he can, and I say we are trying to grow too much spring grain and not paying as much attention as we should to hay and pasture crops. Unless you give your cattle the proper amount of roughage you are not going to succeed. Poor roughage and good grain will not produce milk as cheaply as good roughage and poor grain.

Q.—Where would you get the oats if everybody grew hay?

A.—I do not advise everybody to quit growing oats. It is necessary that you grow some grain crops. You have to grow oats to seed down with, and you must grow grain so as to distribute your labor properly over your haying and harvesting season, but you should not grow too large a crop of oats at the sacrifice of your hay crop, as many are doing.

It is a point that is well worthy of attention, and the figures we obtained in 1915 on the cost of growing hay and oats made us make such a change in our comparative acreage of hay and grain that this year, in spite of the dry weather which made most of our crops much poorer than in 1915, we were able to provide for a larger herd than we did the year before. We have plenty of hay and a fair amount of corn silage. Any man than can grow clover hay, alfalfa hay and a fair amount of silage does not need to worry a great deal about the price of grain, because he has the two foods that are absolutely necessary for the cheap production of milk, and you cannot get cheap production of milk from feeding a large amount of grain.

One point I desire to emphasize with regard to the supply of live stock, and the proper thing to do considering the condition in which the world's supply of live stock is at the present time. Germany at the beginning of the war, as nearly as I can find out—and these are figures that apply to 1913—had between 24,000,000 and 25,000,000 head of cattle, and Germany with her characteristic efficiency, set aside 8,000,000 head for breeding and milking purposes. That left 16,000,000 head of cattle that could, in a pinch, be spared to feed her soldiers and population. In August of this year, the latest figures obtainable are that Germany had left only 4,900,000 head of cattle. There is a great wastage of cattle in Germany, and it means that if this war goes on for another year, Germany will have exhausted all her cattle except the 8,000,000 head of breeding and milking cows. She has used up the natural product of the 8,000,000 head of breeding and milking cattle in addition to all that 16,000,000 that she had as a surplus, except the 4,000,000 head she has still in reserve.

From Austria we can get no figures, but we know that the cattle have been destroyed in Belgium and in Serbia, and there are no cattle left in the Balkans, and I think we are safe in saying that there is a very small surplus of cattle left in Austria, and if the war drags on another year, Germany will be down to her last cow, and perhaps before that time. That means that if Germany is going to feed her people properly, and if she is going to keep up the fertility of her land, if she is going to have any national existence at all, she must use every head she breeds for the first three or four years after the war for building up her herds. And the same thing will apply to Austria, except that probably she is in a worse condition. That means that when the men in the trenches on both sides go back to the farms, as a great many of them will, we will have a production of cereal crops, because that can be started at once, but we will have to wait three or four years for the cattle, and that means there will be a shortage of cattle of all kinds, and it means that prices here in America will be greater for live stock, particularly cattle, than they are even at the present time. That looks like a good argument for holding your cattle.

There is another reason. When the war is over, there will be high prices for cattle and low prices for feed, because if history repeats itself, grain will be low in price, but dairy products will not. I do not think dairy products will come down again to the low levels in our lives, and that looks like another good reason for holding as much dairy stock as possible.

Q.—What does it cost to put corn in the silo?

A.—During 1915 we sowed our corn in drills because it was in a pretty dirty field, and our yield went only about nine tons, and that cost $3.90 to get in the silo. That was a small yield; we could have grown 12 to 13 tons for the same expense, and that would have cut down the cost. There was one field of 51 acres that had a little better yield and we put that in the silo for $3.45 per ton.

Q.—Which way do you think is the best way to sow corn, thick or thin, so as to get some ears?

A.—I prefer to get some ears. I do not like corn sowed so thick that it won't get the right kind of growth. There is a method of sowing about three parts of a bushel of corn to the acre that will give you almost the full growth of the stock and a small nubbin; that kind of sowing will give you the highest yield per acre.

Q.—Don't you think sowing corn thick is an expensive way of watering cattle?

A.—It is, but it does not water the cattle. There is no advantage in putting corn fully charged with water in the silo.

Q.—What kind of soil would you prefer to sow your mixture in?

A.—Any kind of soil that is reasonably well drained. I would not sow it on soil that nothing would grow on.

Q.—How will the farmer winter his stock if he does not grow hay?

A.—He does not require to take two or three acres per cow, if he adopts the method I recommend. There is not a man in this audience but could afford to put in from half to three quarters of an acre of this summer feed for each cow he owns.

Q.—When you turn your cows into this pasture do you leave them there continuously?

A.—That depends on how large it is. If there is sufficient feed to feed them all the time I would leave them there. That stuff must not be allowed to come out in head, because as soon as any one of these plants gets out in head it stops growing.

Q.—Will alfalfa grow on tile drained land?

A.—I should think it would grow better on a tile drained field than on a field that was not tile drained. Alfalfa will not stand too much moisture near the surface of the ground.

Q.—If you leave the cow continuously on the summer pasture, how do you find the production of milk?

A.—We find it keeps them up to what you would expect at that season of the year.

Q.—How do you find the percentage of butter fat produced by green feed?

A.—There is no difference. You cannot influence the percentage of butter fat by feeding. You can increase the quantity, but not the quality.

Q.—What do you consider the best varieties of corn for silage purposes?

A.—I have used with success White Cap Yellow Dent. Taking one year with another, on the College Farm, we have found that to be the best for that district, and I know it is a good corn for this district.

Q.—Do you refer to alfalfa as the best clover?

A.—No, red clover is the seed we use for the pasture mixture. We use a bushel of spring wheat, bushel of barley and a bushel of oats.

Q.—Sugar cane?

A.—No, that is a different mixture, and not the one I recommend so highly for Eastern Ontario. To that mixture of wheat, barley and oats I add six or seven pounds of red clover.

Q.—How late should that mixture be pastured?

A.—We pasture right through till the snow flies, right up to the time we put our cattle in the stable; the red clover supplies the pasture in the fall.

Q.—Have you ever cut the clover the following year for hay?

A.—We have not at the College, I have at other places.

Q.—How long should you leave permanent pasture?

A.—That depends on the soil and how well drained it is. I know one piece of pasture that has been down for seven years, and there are three grasses showing yet, timothy, meadow fox tail, and some orchard grass.

Q.—When do you sow that mixture?

A.—In 1915 we sowed it on the 8th May and this year 22nd May.

Q.—Do you seed with the permanent mixture at the same time?

A.—Yes.

Q.—Do you sow the permanent pasture with the grain crop?

A.—We sow it by hand afterwards because it will not go through the seed drill.

Q.—Do you advise sowing it broadcast or in drills?

A.—If you have a drill, I think I would prefer drilling it in.

Q.—Does your permanent pasture give as good results?

A.—No, although there was a lot of feed on it, it does not stand the dry weather quite as well as the mixture of oats, barley and wheat.

WANTED—GOOD COWS.

CHAS. F. WHITLEY, OTTAWA.

The Dairy Division at Ottawa is still glad to be of service in assisting the cow testing movement, helping farmers to make sure that they have good cows. A hope of better things and better times looming ahead through the misty future has buoyed up many of us. But in ordinary farm work, a vague hope or expressed want without some good definite plan of action does not guarantee success. Hence any dairyman who hopes and works for a better herd is cordially invited to consider the help that cow testing gives in this quest for improvement; he, in common with many others, should acclaim it useful as a pathfinder, a forerunner of true prosperity.

Who wants good cows? Naturally, anyone who attempts milk production. Every dairy farmer with a single spark of ambition surely wants that inspiring personal satisfaction which the keeping of good cows can and does impart. Men who are not yet dairying but believe in this cry of back-to-the-land will want good producers. Are we to outfit our returning soldiers, when tired of raising roosters, with a mongrel deadhead, or a real dairy cow?

One man has shown us from record sheets that he obtained as much in ready cash from his six cows last sunny June as was brought in by the whole nineteen that made his neighbour's herd. The first man has applied the knowledge gained from cow testing.

Where are good cows wanted? Recently, in a "3 b" section, where the produce is just beef and beets with scores of bachelors, I thought their progress might be well inclined towards "4 c's," the cream of life, cows, clover and children. One letter makes all the difference, cow testing shows that each cow kept may be a dynamic force, not a howling farce as a producer. Outside the strictly fruit or beef locality, there is plenty of room in this favored province for the extension of high class dairying. Cow testing will not only save from the present heavy general and personal burden of poor cows, but, through proving the economical advantages of better feeding, the immense value of pure-bred sires, the real worth of young stock and selected dams, with this four-fold twisted thong to its all-powerful bow.

cow testing will enable successful marksmanship to be made on the butts of good herd building anywhere.

SOME CONTRASTS, DAIRY RECORD CENTRE WORK.

—	The ten best cows.	The ten poorest cows (Mature)	Difference.
Average yield, lbs. milk	6,406	2,459	3,947
" lbs. fat	215	97	118
Value, milk at $1.20	$76 87	$29 50	$47 37
Feed cost per cow	34 04	27 85	6 19
Profit per cow	42 83	1 65	41 18
Feed cost, 100 lbs. milk	53c.	1 13	60c.
" 1 lb. fat	16c.	29c.	13c.

Thus, each one of the ten best cows made as much clear profit as twenty-five of the poorest.

Contrasts like these, taken from one of our dairy record centres a little east of here, where over 800 cows are under test, show very plainly that some poor cows do still exist. But at the same time it is apparent that men hard by have succeeded in raising fairly good cows, able to return good profit and produce milk and fat at medium cost. If such extraordinary differences exist either in your own herd or in herds at any factory, is it not high time they were discovered, and the draft in favor of good cows duly honored on the bank of your determination?

Happily our records show that better cows are being obtained; we all can sense the need of far more of the good brand. Think, for instance, that Saskatchewan carries less than two head of cattle for every 160 acres. Do your acres at home to-day carry all the cows and produce all the milk that they might?

Again, good cows are wanted not only now in these times of soaring prices, but for years to come as fine milk products are appreciated as choicest food. Artificial milk does not yet replace the natural, twice a day, silver stream of nourishment, the universal staple; so the bogey of lessening demand need not frighten any one from wanting more cows. Indeed, with the growing demand for milk and the harassing problem of adequate farm help seeking to be solved, there is the more need for dairy records so that man power and cow energy may both be rightly directed, thriftily conserved.

Records sent in to us show, for example, a man with ten cows getting only thirty-six thousand pounds milk, but a neighbor with six cows obtaining almost fifty thousand pounds, the good six do as much, therefore, as thirteen of the other kind. Cow testing means discrimination, so that paste imitations may be discarded from our dairy herds, the diamonds retained.

No transaction with any cow is justly deemed complete until the good dairyman is fully satisfied. So the suggestion is thrown out that you do not let indifference wreck the bright summer of your life. As your own road master, you might flag it with a cow testing outfit; then you have the "line clear" signal for every day, less operating expense, each section thoroughly efficient: you banish both blue Monday and horrible black Friday, in fact the whole "winter of your discontent." For when you depart at an abrupt angle from the beaten track of the poor and the average, you have through cow testing that definite something which is always a full 100 per cent. sure, the open sesame to new daily dairy delights. This is no romance, but the written verdict of herd owners.

There is no cow too good for Ontario dairymen. From amongst our members who weigh and sample each cow's milk regularly there come good orders to encourage the forethought of prominent breeders. One week last fall twelve pure-breds were purchased in one of our centres. Our records abound with such results as these: Herds at Hallville, Oxford Mills and Perth giving over 8,800 pounds of milk, over 300 pounds of fat for each of 8 and 10 cows; at Renfrew and Frankford herds of 13 cows averaging over 9,000 pounds of milk, and 9 cows with an average of 11,000 pounds of milk and 352 pounds of fat. Beyond that we can instance good grade cows east of Toronto giving between 400 and 500 pounds of fat. On all such farms where cow testing is practised supreme satisfaction reigns.

What is a good yield? The standard of excellence may vary according to the owner's discernment, ability and opportunity. For we find cows that dry off in six months having given only 2,200 pounds of milk and 80 pounds of fat. That type adds to the high cost of living, but the individual record of 8,000 pounds of milk and 280 pounds of fat, or more, makes higher living enjoyable.

So if the level of production in your herd is now 6,000 pounds of milk and 210 pounds of fat for each member before you consider her efficient, cow testing will help you to raise the standard line to the bright honor line of 10,000 pounds of milk and 350 pounds of fat, then from that vantage point leap once again to higher ground.

The candles of many intellects in all provinces have been snuffed over this problem to burn all the brighter, so that scores of herds can be instanced where large increases in yields have been obtained.

The constant use of a simple milk record has shown these men how to secure another 3,000 pounds of milk per cow, and it can also assist any man, really in earnest, to add 50 per cent. to his income.

Such increases mean that these men are weaving golden threads in the tapestry of Canadian dairy history. Will you not profit by their example? Many voices urge towards really good cows, let cow testing help you to help yourself.

ADDRESS.

W. Bert Roadhouse, Deputy Minister of Agriculture, Toronto.

In taking the chair this evening I know I can say that the Association is delighted and encouraged by the large audience which is assembled on this occasion, and I feel sure that the audience will not be disappointed by the entertainment which has been provided.

When I think of Napanee I am reminded of one particular instance in the history of the town which forces itself upon me, and upon the minds of many of those who are in attendance at this meeting. I am reminded of the fact that Napanee was the birthplace of one who, only a few months ago, filled such a large place in the agricultural life of the Province of Ontario and of the Dominion of Canada, I refer to the late Dr. C. C. James, who was born in this town. Although his duties called him to various parts of the country, and although his parish was for a time Ontario and latterly the entire Dominion, I happen to know that he never forgot the town of his nativity, and retained for it the fondest memories to the last. On many occasions Dr. James graced the convention of the Eastern Dairymen with his presence, and I am sure the members of the Association miss him on this

occasion when he is no more with us. In giving to the Province the life and character of Dr. C. C. James, Napanee is entitled to enduring renown as having given to the world one who was one of the most capable public servants. He was most efficient and far-seeing, and one of the best public servants this country has ever had. On many occasions, he, by voice and pen, sought to advance the interest and welfare of the agricultural community, and particularly of the dairy industry. Although his work is now done, his influence will still go on, and his example will still be an inspiration to those of us, who, however unworthy, are left to carry on the work.

While I am speaking of the late Dr. James I am reminded as well of the fact that the past year has told heavily upon some of the most prominent friends of this Association. I do not think there has been a convention of the Eastern Dairymen in the last quarter of a century, or more, which has not been graced by the presence and helped by the influence and personality of the late Senator D. Derbyshire, of Brockville. He, with Mr. John R. Dargavel, whom I am pleased to see here to-night, and with perhaps a few others, was the pioneer in the organization and development of this Association. Not only in the initial stages, but through all the years, he was its guide, philosopher and friend, as Mr. Henry Glendenning, who I see in one of the front seats, can testify. In the passing of Senator Derbyshire the Association has lost one of its best workers. The industry has been placed on such a footing that it can "Carry On," and still carry out the great purpose for which he strived and which he always kept in mind. There is one other whose name might be mentioned in that connection, and that is the late Minister of Agriculture for the Province of Ontario, the Hon. J. S. Duff. During the past eight years in which he occupied that position he has been a frequent, and I think always a welcome, visitor to this Association, and he, too, has passed away. In the three names I have just mentioned, the year 1916 will long be remembered as terminating the lives of men who were of such importance to this Association. I am reminded of the impressive words used by the Prime Minister of Canada when he said: "The nation belongs not alone to the living, but also to those who have passed away and those who are yet to come." And as we turn to the problems which confront us at the present time, I think we will do our duty and do what lies before us the better by remembering the heritage which we have in the lives of those who have gone and the debt which we owe to the future. With these few words, which seem to me only fitting on this occasion, I have pleasure again, on behalf of the Association, in thanking you for the attendance here, and in expressing the hope that you will feel that the time was well spent. (Applause.)

ADDRESSES OF WELCOME.

The delegates were then welcomed to Napanee in eloquent addresses delivered by Mr. G. F. Ruttan, Mayor, and W. J. Paul, M.P., Addington.

INCREASED PRODUCTION AND AFTER THE WAR PROBLEMS FOR DAIRY FARMERS.

A. A. Ayer, Montreal, Que.

Mr. Ayer introduced his subject by referring to his boyhood experience in the early fifties on the old homestead where both butter and cheese were made, followed by his coming to Montreal in connection with the butter and cheese business before the time that the first cheese factories were built near Ingersoll, Ontario, and at Dunham, Quebec. He also referred to his early visits to the factories, when sales were made only two or three times during the season.

There has never been a time in the history of the dairy industry in Canada when it was so important that the creameries and cheese factories of the whole country should confer, together with the farmers, over present conditions and after-the-war problems, with a view of joining forces to work out a plan for increased production of food products.

The scarcity of food and the high prices therefor occasioned by the war is a world problem.

The prices obtained for butter and cheese during the year 1916 have been phenomenal; no one living has seen anything approaching to them, but it goes without saying that the day will come when prices will react to former levels. Did you ever hear the expression: "He died of prosperity"? It will require a great deal of watchful care on the part of all concerned, or the same may be said in future years concerning many dairy farmers. And there are others besides dairy farmers whose money quickly earned may be quickly spent.

All the provinces in Canada make butter, but only Ontario and Quebec make cheese to any extent. You may be astonished to hear that the total make of butter is estimated at 4,000,000 to 4,500,000 boxes of 56 lbs. each, while the make of cheese is only about 2,250,000 boxes of an average of 84 lbs. each. Twenty-five cents and even more was paid for cheese, and 44 cents for butter. The average price paid for butter during 1916 in the country markets of Quebec was about 35 cents; and the average price paid for cheese for the year in the Province of Ontario was between 18 and 19 cents, and somewhat less in the Province of Quebec. Do not interpret this statement to mean that the farmer in the Province of Quebec obtains less per hundred pounds for his milk than you do in Ontario, for the direct opposite is the fact, the reason being that the milk in the Province of Quebec is much richer than that in the Province of Ontario, and, therefore, it does not take as many pounds of milk to make cheese there as it does here. This fact, however, seems to be misunderstood generally in Quebec, even by the Dairy and Agricultural Departments there, and hence their strenuous attempts and claims to prove that prices obtained in Quebec equal those of Ontario.

It is not the price of cheese nor of butter that the farmer should be most concerned about, so much as the price or returns per hundred pounds of milk. The real test of every dairy, however, is the *returns per cow.*

I understand Ontario proposes paying for milk according to the per cent. of butter fat. May I suggest that the cheese makers keep in mind that 4½ to 5 per cent. milk will not make quite the same type of cheese as 3½ per cent. milk.

The main reason why the Province of Quebec is the principal butter producing province in Canada is because of the richness of the milk, and on that account most of her farmers have found that it pays them better as a rule to make butter than it does to make cheese.

There has been an improvement in both provinces in the quantity of milk per cow, but there are very few dairies in either province but might increase the quantity of milk 25, 50 even 100 per cent.

The cost of mill feed and grain is given as an excuse for not feeding; even if it does not pay to feed, it is the *duty of every farmer to produce* the greatest amount of food possible in these war times.

Cattle and hogs have advanced in price; beef and bacon are dearer; milk has advanced in price; butter and cheese are fifty per cent. dearer than before the war; but these prices have come through the events that have led up to the supreme sacrifice of our young men from Canada, the British Empire and our Allies. This horrible war has caused an unusual demand for food of all descriptions. It is the *shedding of blood which is bringing wealth to the farmer* with comparatively little extra expense to him.

In other words, the great law of supply and demand has caused the extreme advance in all food products, and the demand has been brought about from various reasons in connection with the war, the principal reason having been the shortage of supplies from other countries and the natural wastage causing an increased supply necessary per capita for the feeding of the soldiers on the field.

Note how a comparatively small exportation of butter to England effects the prices of two or three million boxes. About three per cent. only of our total make was exported, and immediately the price at which it was sought after caused the general price to advance several cents per pound.

On the other hand, if the price of butter had not advanced to a parity with the advance in cheese, the farmers would have turned to cheese making and thus reduced the quantity of butter until the advance took place.

The increased consumption of milk is also an element in the advanced price of both butter and cheese.

The following figures giving the imports of butter, cheese and eggs into Great Britain from various countries before the war, and the same articles since the war will further show a reason for the advance in the price of these articles both in Canada and the United States. Not for many years has the United States exported much cheese or butter until during this war.

It may be interesting to note the growth of the total value of the products of the dairy in Canada, comparing the year 1913 before the war with the years 1915 and 1916 since the war:

Exports Cheese, open navigation, deducting U. S. Cheese.	c. per lb.	Total make estimated.	Total value.
1913—About 1,580,000 boxes....	10½ to 13½ (average 12¾)	1,750,000 boxes	$16,250,000
1915— " 1,750,000 "	12½ to 17½ (average 15)	1,950,000 "	25,000,000
1916— " 2,000,000 "	14½ to 25) (average 18¾)	2,300,000 "	36,000,000

The receipts of cheese in England from all countries were: 1913, about 3,000,000 boxes, 1916, about 3,500,000 boxes.

CANADIAN BUTTER.

Total receipts in Montreal, open navigation.	Average price.	Exports.	Value.
			$
1913—435,425 boxes.....	24 cents	7,300 boxes	98,000
1915—373,503 "	27½ "	54,495 "	850,000
1916—430,000 "	35 "	135,189 "	2,700,000

It is estimated that of the above receipts 80 to 85 per cent. were the production of the Province of Quebec.

Total make in all Canada estimated at 4,000,000 to 4,500,000 boxes. (Mr. Ruddick's estimate.)

Total value of butter produced for the year 1916, $80,000,000 to $90,000,000—for all Canada.

Year 1916.

Estimated total value of Canadian hog products	$75,000,000
Estimated total value of Canadian eggs	50,000,000
Estimated total value of Canadian butter	80,000,000
Estimated total value of Canadian cheese	35,000,000
	$240,000,000
Total value of above exported, about	$75,000,000
Increased value of 1916 over 1913, about	$100,000,000

The poor in the great cities have my deepest sympathy, and I try to do my part with thousands of other citizens of Montreal in helping them every winter; but there never were less poor in the great cities than there are to-day; there is no occasion for any able-bodied man or woman to be poor, there is plenty of work for all at double the prices that were paid before the war. I have no sympathy, however, for the farmer in these times who claims that he cannot afford to pay the price for hired help to carry on his farm. There never was a time when he could afford to pay so much as he can to-day!

What is required of the farmers in the way of helping to win this war is more intensive farming. Each acre should produce more this year than it has ever produced before; each cow should produce more milk than ever before. No farmer should kill a calf until it is at least a month old, so that it will be valuable for food and its skin valuable for leather; moreover, more heifer calves should be raised so as to increase the dairies and provide for an increase in milk when the decrease in price comes, as it surely will come.

From present appearances a month old calf will sell for unheard of prices next spring.

The cattle have been killed in nearly all countries at war to an alarming extent, hence there will be a great scarcity of milk products and beef for some years. This should warrant farmers in keeping their heifer calves at least until next November, when perhaps they can see conditions more clearly.

The cry is abroad that mill feed, particularly bran, shorts and middlings, are too dear to feed. Milk is worth more than double its price before the war, while mill feed has scarcely advanced fifty per cent.; that excuse, therefore, will not work.

If it did, are you not willing, in order to win this war, to do something to increase not only the make of butter and cheese, but to increase the hog product and make young beef? One would expect to see all the farmers happy and anxious to help in every way, but some people are never quite happy unless they take it easy.

Two hundred and six hogs were delivered in Montreal the other day. One hundred and sixty-four averaged 152 lbs. live weight, 42 averaged 105 lbs. live weight; I know where they came from, and I found out that the reasons the farmers did not keep them until they weighed 180 to 200 lbs. was that feed was so dear that it would not pay. Is that the way the farmers are going to help provide food to win the war? Is their patriotism limited to what pays? I believe it would pay—or at least that there would not be a loss and the manure would help intensive farming. I hope the instances are few where farmers are willing to accept advanced prices and give nothing in return.

I give all praise to the cheese makers of Canada. They have never made better cheese than during 1916, and I hope that with these extreme prices the farmers of this country will see that the makers of both cheese and butter are properly paid for their work; they well deserve it.

Every man, every woman, every child that is old enough to do so, male or female, throughout this beloved Canada of ours, must put his or her hand to some kind of work and do his or her bit, if we in Canada are to do our part in winning this war, and so help to make peace with all the world.

We shall never have a peace conference until there are prospects for a lasting peace. We shall never have a lasting peace until the Germans are brought to their knees thoroughly beaten. Then we shall grant them freedom such as they never had. Then shall there be a Germany at peace with the world and all the nations at peace with each other.

AGRICULTURAL RELIEF FOR THE ALLIES.

A RECENT VISIT TO ENGLAND AND FRANCE.

Dr. James W. Robertson, Ottawa.

I join in the appreciation which has been expressed of the good work accomplished by the Dairymen's Association of Eastern Ontario. I include in that appreciation the cheese makers and butter makers and the farmers and their wives and families who have done their part and carried on their work with equal diligence and ever increasing intelligence. Those who have made most progress and have helped others best have derived the compensation of personal satisfactions and gained benefits beyond any money they have made. From rendering public service, as well as from following private occupations, different kinds of compensations come to men and women. Some gain possession of property in one form or another. Some measure success only in terms of the things, the material things, they have been able to get and keep. But we must never leave out of our reckoning the other results from good, honest, intelligent work. There are growths of the spirit as well as of the crops. There are gains of the mind as well as increases of income. There are enlargements of capacity as well as additions to production. There is improvement in the setting of life, in the farms and factories and homes of the dairymen; and I like to think there is also advancement in the quality of the life

itself, in character, in intelligence, in goodwill, in desire and power to co-operate for the common good. There is a widening and deepening of interest in education for farm boys and girls, in good roads, in making the country a more enjoyable place to live in as well as a place where a better living can be made. These are some of the gains which do not find a place in bookkeeping or the statistics of production or in market reports; but they are among the best things which dairymen have found through developing their business and themselves.

To-night I am not to speak to you on dairying; I am to talk to you of scenes far removed from the placidity of this hall and the peaceful activities of dairymen. I am going to tell you of some things I saw and felt when I visited England and France, last August and September.

Agricultural Relief for the Victims of War.

Since the war came, many organizations have been called into existence to render relief to the immediate victims of the atrocities of war on the continent. One which is but little known is the British Committee for the Agricultural Relief of the Allies. The King is the Patron and the Duke of Portland is President. Lord Northbrook is Chairman of the Executive Committee, and Mr. Charles Adeane is Honorary Treasurer. His Excellency the Duke of Devonshire was a leading member of the Executive Committee in England until he came to fill the office of Governor-General of Canada. He has graciously become the Patron of the Fund in Canada.

Much good service has already been rendered by this Committee to the peasant farmers in the devastated regions of France. Seed grain was sent in time for the spring sowing. Live stock has been given, among the notable contributors being His Majesty the King with six rams from one of the royal flocks. Donations have been made of much needed agricultural implements and tools. The Germans in their retreat during the battles of the Marne gathered field implements in heaps and put bombs under them. They burned farmhouses wantonly as a deliberate part of their policy to leave the war area utterly desolate.

Recently the Overseas Dominions were invited to join in the work of relief. Thus the farmers of the whole British Empire will be able to render friendly and much-needed help to the stricken farmers in the regions which have been devastated by the enemy. When the occupied territories of France, Belgium, Russia and Serbia have been cleared of the invaders, the task of reconstruction will be too great for the peasants, who have lost everything except the land itself.

Last summer arrangements were made for a representative deputation from the British Agricultural Relief of the Allies Committee to visit the devastated regions in France. It consisted of Sir Herbert Matthews and Mr. Percy Hurd (English Committee), Senator the Hon. A. J. Fuller (South Africa), Senator J. H. Keating (Australia), Mr. Charles Elgar (New Zealand) and Dr. Jas. W. Robertson (Canada). The French and British authorities in France provided facilities for an inspection of the devastated regions in the Departments south of Verdun and at the Somme.

Canada in the War.

The part we have chosen to take in the war has put some of us into the crucible of sacrifice; it has lifted some of us into another plane of service on behalf of the great cause of humanity. Canada took her place and part in the war of her

own free will. Her action was in entire accord with the spirit of her people and their traditions. Her contributions so far are three hundred and eighty-three thousand men. Every Canadian is a volunteer who has enlisted to fight with the Mother Country and the allied nations for the great cause which they are upholding. Already over two hundred and fifty thousand of her men are overseas, and more than one hundred thousand of them are in the fighting lines in France and Flanders. It was not the spirit of adventure that took them from peaceful occupations, but the love of honor and justice which constrains them to uphold these cherished principles to the last full measure of devotion which free men can pay.

The Navy's Task.

I crossed the Atlantic in August on one of the troop ships under convoy. As we left Halifax harbor a cruiser, with an admiral aboard, steamed past the transports. The warship's band played "Oh! Canada!" Our men sang the chorus "Oh! Canada! we stand on guard for thee." Then our bands replied with "Rule Britannia." The songs gave fitting expression to the feelings of the men of the army and navy for each other and for the homes and the civilization which they defend and guard. I never travelled with a more wholesome, healthy, happy company of men. They were neither ignorant nor thoughtless of their mission or its dangers. They seemed to be animated—one almost said transfigured—by a high resolve to do their part to the end.

When still more than two days this side of our port, I was told, "At noon to-morrow, we will be met by the destroyers and then each ship will take her course with her own special convoy." At half-past eleven the horizon was clear. At twenty-five minutes to twelve a number of specks of smoke grew out of the sea. The specks grew into streaks and then I saw the destroyers racing towards us. Our ship was going three-quarters speed to keep pace with the slowest steamer. At noon precisely the gong on the under bridge sounded, the indicator marked "Full Speed Ahead," and off we went with a destroyer gambolling in front of us and beside and around us like a watchful dog unwilling to restrain its racing energy. Consider the wide ocean, the wastes of waters, the vast distances, the hundreds of ships converging on and leaving the British Isles, the innumerable duties of the navy, and then reflect, "at noon to-morrow." Precisely at noon the engagement was kept. It was a matter of surprise to a naval officer that I should find anything surprising in what I have stated. To the navy it was the usual way of carrying out the work of one of the ordinary 365 days of the year.

As soon as one leaves Folkestone, England, to cross the channel to Boulogne, France, the evidences of a whole nation at war thicken and deepen. Without the mastery of the seas by the invisible as well as the visible navy the multitudinous traffic to France could not be maintained. Comparing what I saw with what I recall from times of peace, I suppose the cross channel carriage of men and materials is now twenty times greater; and it has been and is being done safely, speedily and comfortably, barring the slight inconvenience of a little crowding on the steamers. I salute the golden silence and the eloquent service of the visible and invisible but ever invincible navy.

With the British Army

Of the British Army in France I had read much. I had read with a certain reserve the unstinted praise of its spirit, its unfaltering courage and, in later

months, of its sufficient equipment. I no longer have any reserve. I had read nothing which adequately represents what I saw and felt. Near the front I saw Australians, New Zealanders and Indian Cavalry with hosts of Kitchener's Army from England, Scotland, Ireland and Wales. I saw Canadians marching towards their places for the great attack at Courcelette. I spoke with some men of one company. I passed several others. The occasion was not one for any affectation or posing for effect. I wish Canada could see the serious, confident, happy bearing of her sons when their hour of trial was ahead. One could only smile through tears while the heart beat faster from pride in the bearing and spirit and character of the men.

Miles and miles, and again miles, behind the cutting edge of the wedge at the front, as far as the eye could reach were encampments and encampments of infantry and cavalry and artillery and aeroplanes. The country roads were thronged with traffic like the main thoroughfares of a great city. At crossings and junctions of roads in the open country soldier-policemen directed the traffic. I did not see one blockade or hear an ill-tempered wrangle.

Canadian Medical Service.

The visit to England and France gave me opportunities of seeing something of the Canadian Army Medical Service, a little of the work of the British Royal Army Medical Corps and of the French Hospital service for the wounded. The order, sanitary cleanliness and good health of the men in the encampments do not just happen. They are the result of intelligence, knowledge and industry, organized for application to all kinds of situations all the time. The sanitary and medical staffs never seem to consider the question of personal ease for themselves. In mid-summer there were at one time only 22 cases of typhoid fever in the British Army in France, supposed to be between one and two millions of men.

From the wounded men in motor ambulances, just behind the usual range of shells, to the men in hospitals and convalescent homes in England and Scotland I followed the route stage by stage. The material provisions are marvels of suitability. The hospitals of from 800 to 1,200 beds each are models of order and neatness. That is evident on the surface. One such had handled 500 cases from the Somme on the morning of the day of our visit. Nothing seemed to be lacking. But the doctors and nurses are the outstanding factors. Continuous contact with the wounded has not bred callousness but rather the beautiful quiet of controlled gentleness and strength. The medical profession of Canada has evolved for itself a new nobility through the fine service which makes men and women great. Canadian University Hospitals have taken their place among the best in the reputation for good service which they have won. They have been gaining, from the first, deep respect and high honor for themselves, the Universities and Canada.

The Red Cross.

The Red Cross Society is the handmaid of the military medical service at every turn. It supplements what the military authorities provide and do. The women of Canada cannot hear at first hand the words of gratitude for the supplies and comforts they have made and sent. They cannot individually see the thankful look of those to whom they minister. But somewhere, somehow there must surge into their souls the sense of reward although they look for none.

The need for Red Cross service is still great, and Canadian women, I am sure, will no more fail to meet it than will the Canadian men with the forces to do their duty. Out of its abundance the Canadian Red Cross Society has been giving over six thousand cases of hospital supplies per month to the French, Belgian, Serbian, Italian and Russian organizations. That action is greatly appreciated and will no doubt be an encouragement to every Canadian Red Cross worker.

The Armies of France.

On a beautiful day in September, two years after the battles of the Marne, we traversed the country for about 125 miles, along the middle of the battlefields. During the five eventful days from the 6th to the 11th of September, 1914, seven great armies of Germany, with over a million and a half of men, had met in pitched battle seven armies of France and one small army of Britain. The battlefields extended from the River Ourcq, to the northwest of Paris, along the valley of the Marne from west to east, through Champagne to the Meuse, North of Verdun, and from the Meuse southward outside Nancy in the direction of Switzerland. The fighting fronts were about 200 miles long. It was a great series of battles. The German hosts were the more numerous; they were in the proportion of about three to two; but the French and British armies were made up of better soldiers and were led by better officers. The headquarters staff of France, under Joffre, outgeneralled the German staff at all points. After three days of fierce attack and counter attack, the great struggle drew to a close between the 9th and the 11th of September. The certainty of victory for France began to emerge on September 9th, when Foch of the French army at the centre of the line defeated Von Hausen. Two days before, on 7th and 8th September, one of the largest of the German armies, under Prince Rupprecht of Bavaria and the immediate presence of the Emperor of Germany, had lost over one hundred and fifty thousand men in a vain effort to shake the defense put up by the French army under Castelnau, on the eastern frontier beyond Nancy. The four largest of the German armies, under Von Hausen, the Grand Duke of Wurtemberg, the Crown Prince of Germany and the Crown Prince of Bavaria, had been definitely defeated. The retreat of three of these armies became practically a rout. The outcome of the greatest series of pitched battles of all time was the retirement of five German armies to entrenched positions along the river Aisne and to the country north of Verdun, from which they have never since been able to advance. The recent gains of the French at Verdun and the British at the Somme may be but the beginning of the great push which will thrust the German armies, not merely defeated but demoralized, out of France and Belgium. One understands better the confidence of the whole British and French nations, as to the final outcome of the war, when one knows how great was the victory over the Germans in those early days when Germany was at the height of her power and pride, after forty years of preparation, and when the Allies were only beginning to get ready.

I saw several thousands of the men of the French armies. On the whole they were taller and larger men than those of the British Army, except the overseas troops and a few regiments from the United Kingdom. Officers and men alike were radiant with alertness. I saw several large bodies of troops coming out for periods of rest from the Forest of Argonne and Verdun. They looked as fit and confident, although not so spic and span, as our Canadian boys under review. Everywhere along the valley of the Marne, at Paris, at the Somme, I heard and saw and felt plentiful evidence of the cordiality of the appreciation of the British

by the French, and of the French by the British. In France and Britain the *Entente Cordiale* has been sublimated from a political phrase into national devotion to a great cause with and for each other.

Devotion of France.

The heroism of the French armies in the field is matched by the patriotism of the French workmen in the factories and the devotion of the French women in the fields growing and saving crops. Other women in the munitions works serve France with a tenseness, capacity and endurance which wages alone could not buy. They work for France.

On the journeys to the devastated areas we saw much of rural France as undamaged by the war, except for the absence of all the young men with the army. The farms were still well cultivated, although less free from weeds than formerly. We saw women and children and old men carrying on the usual operations of agriculture. Women were driving reaping machines; women were on carts taking the grain from the field to the stacks; women and children were on the stacks; and in shape at least the stacks were as well built as formerly. In a few instances soldiers in blue-grey or khaki were helping; and we saw some prisoners of war working in the fields.

Work of Reconstruction.

What is left of the rural population has begun the work of reconstruction. For example, at Sommeilles there are many temporary hut dwellings probably 12 ft. by 24 ft. in size. In front of one of these a Canadian mowing machine was observed, one of the recent gifts of the British committee. From the bits of ruins of the front walls of the Town Hall one could estimate that it had been a commodious place of considerable dignity. Not any part of the walls as such may constitute parts of the new structure. Meanwhile, the residents have erected, at a cost of some $1,250, a very plain, simple building, with one room for the town business, two rooms for the school and small living apartments for the teacher. The women and children who were carrying on their simple tasks were examples of how resolutely these people are making the best of things for themselves. The personal appearance of those remaining gave the impression that although they have been impoverished by loss of property they have been enriched in bearing and spirit. I did not see one woman or child who was not neatly clad.

There are many sad spots in that region whose immediate presence called up memories of the awful doings of the Germans in those early days of unbridled arrogance and ferocity. We talked to one young girl who had seen the mayor and his young daughter dragged from the cellar and shot. The brutal murderers openly mutilated the body of the young woman with their weapons.

The French Canadians and France.

There are many special reasons why Canadians should be particularly interested in France. There are over one and a half millions of Canadians of French origin whose mother tongue is the French language. Some people in Britain and France wonder why they did not spring to the side of their Mother Country as the British born (native Canadian, English, Irish, Scotch and Welsh)

rallied around their Mother Country. There has been amazement at the apparent indifference of French Canadians to the fate of France and to the fate of modern civilization in Europe.

Before the war the masses of French Canadians had little more knowledge of or interest in France than the population of France had concerning French Canada two centuries ago. A few leaders knew France. Most of them misunderstood her. Her enemies called her decadent. Travellers and the newspapers had called her gay, frivolous and inconstant. They now speak of a new France born of adversity. But France has not changed so much as the outside knowledge and understanding of her have been corrected. For over a century France has gone on steadfastly and patiently, but tenaciously, towards liberty through self-government, equality before the law and fraternity among all the people. She has been a great leader in civilization. The French nation has enriched and advanced civilization by contributions in every field of endeavor. As you know, her people are noted for their commerce, agriculture, industry and frugality. They have been foremost as exponents and producers of things beautiful. Their list of great names is a roll of honor. Foremost among these is the name of Pasteur. He was a great benefactor. He scorned to make himself rich by his discoveries. It was enough that he toiled and gave freely to mankind as the Almighty had given talent and genius freely to him. The honor is to him, the glory to France, and the gratitude to God, the giver of every good and perfect gift. Pasteur was among His best. I regard him as a typical Frenchman. The French temperament may be volatile and impulsive, even explosive at times; but the French character is a compound of mobility, solidity and nobility.

French Canadians Recovering Their Love.

But the masses of the French Canadians had lost touch. The habitant's interests were absorbed in, and limited to, his family, his farm, his church and his local politician. The war, however, is thrusting its pulsations of feeling into the exclusive and seclusive life of the French Canadian. He is recovering his love of his Mother Country, France. Pride of blood, pride in the greatness of her character, rapturous exultation in the recognition of her glorious achievements make his heart beat faster as he learns of the heroic deeds of the race to which he belongs. Already many French Canadians have equalled the other Canadians in the quality of their fighting for the common cause of humanity, freedom and fair play in France and Flanders. No drawn-out eulogy could express higher praise. I have talked with some of them in the hospitals in France and England. They had nobly done their bit.

One Sunday I had the pleasure of visiting the French Canadian hospital stationed at St. Cloud, Paris. That hospital receives wounded from the French armies. The wounded patients often report that they applied to be sent to that particular hospital because comrades, who had come back to the front after treatment there, spoke so highly of it. On the day of my visit the chief surgeon told me that that morning there had been a serious case of amputation to a French soldier who before his arrival had lost a great deal of blood. After the operation was successfully performed it did not seem that the man had enough vitality to pull him through. The surgeon called for a volunteer who would furnish fresh blood. A young French Canadian by the name of Private Gariepy, from Montreal, volunteered. He spared a quart and saved the young Frenchman's life. I talked

to both men in the afternoon, and am not sure which was the better satisfied with and more proud of the success of the *Entente Cordiale.*

After Victory has been Won.

One hears the question asked with earnestness, not without anxiety: "Will the great war, and the part which Canada is taking in it, make any changes of deep and far-reaching import?" There is evidence, in abundance on all sides, of change in our estimates of the relative values of some of the things which used to occupy our time, our thoughts and our strength. We are not less diligent in business or fervent in spirit; but now we direct our diligence and our fervor to the support and advancement of great causes apart from any personal advantage. In many noble cases our people are doing that in direct sacrifice of personal comfort and temporal welfare. The public good, the glorious traditions of our race, the honor of men and nations, the maintenance of righteousness, have been transmuted, from pleasant phrases on our lips, into heroic deeds on land and air and sea and to devoted service in hospitals and homes and wherever men and women can do their bit. We may confidently hope, we may earnestly pray, that these changes in point of view, and in character of action in personal and public affairs, will continue with us after complete victory for the arms of the Allies has been won. All of us will have no less arduous duties to perform and no less honorable obligations to discharge in the years of peace than in the stress of war. The great warfare of the ages is still before us to be accomplished in Canada. We must enter with a purified and courageous spirit upon the old campaigns for the uplift of the people through education, and the betterment of conditions for wholesome living through unselfish public service. Our warfare will be directed against the primary causes of war and evil. These are selfishness, greed, pride, ignorance, poverty, vice, disease and illwills.

We of the British Empire are sharers in the common heritage of language, love of liberty, standards of righteousness and institutions for education and self-government. We believe we are animated by a noble ambition to pass on, to those who shall come after us, our priceless inheritance undiminished, unimpaired and enriched by what we as nations and individuals do and become. To that end we must cherish and pursue the great ideals towards the realization of which our Empire and our Dominion are pledged for themselves and for humanity. These include the right to self-government, the maintenance of honor and humanity in the relations between nations, great and small, and the culture of the British, yea the Christian, spirit of fairplay. What our forefathers have been and done, in those fields of high endeavor in the past, is the promise of what we can be and will do.

Canada has been made up of communities of many races, languages and religions. We seek to conserve the best out of each and to learn something from all. Other nations have been welded into unity in the fierce furnace of adversity. In our case we hope, after the war, to grow into a united people under the burning enthusiasm of a common purpose to make Canada great, particularly as a place for happy homes, healthy well-trained children and righteous-minded people. We are a young nation with all the fine attributes of youth. The experiences of the war have consumed some of the handicaps of immaturity and left in their place an intelligent recognition of responsibility for international service. We must play our part in world affairs for our own sakes and for the good we may do.

Our best contribution to civilization may be to achieve out of our composite nationality the fine art of living happily together while working for the common good. Success in that field will bring to us a warfare accomplished which will make Canada a land where the fear of God, the labor of honest men and the love of gentle women will make the nation great.

An Appeal for Aid.

Meanwhile we, who have escaped the horrors of battles on our own soil and have been protected against the ravages of invasion, should willingly lend a helping hand to those other farmers who have lost everything except the land itself through the awful processes of war. Canadian dairymen have done well. Prices have been high. The seasons have been favorable. Production has been large, Out of our abundance we will surely spare enough to help our brethren of the allied nations to get on their feet again. We have been united with them in defending the cause of justice and liberty and fair play. We will be united in victory over the arrogant barbarisms of our enemies. We must not fail to be also united in helping to lay foundations for the restoration of the farmers of the devastated regions. Let us give them a friendly lift in their time of need. Let us do it for their sakes, for our own sakes, and for the sake of the memory of those who have given their all, even unto life itself, to rescue and preserve humane civilization founded upon righteousness throughout the world.

Further Remarks.

At the forenoon session of the following day Dr. Robertson said:

Mr. Chairman and Gentlemen,—I do not propose to make a dairy speech this morning. I enjoyed listening to the discussion of this session. I put my hand across my brow on two or three occasions to see whether I had not been asleep for twenty years and had not just awakened in the middle of the same discussion.

The farmers of our Allies, in the devastated regions of which I spoke last night, have lost everything in the war. In some places the land itself is torn beyond any possible recovery into use for growing crops. The whole British Empire wants to help these farmers to get on their feet as soon as they get back into possession of their farms. Their houses and machinery have been destroyed. They have nothing left with which to begin farming again. We on the other hand have lost nothing as farmers through the war; but in some cases have made a great deal of money because of the increase in prices. We ought to help our stricken brethren as soon as the enemy is pushed out of their countries. We want to do that for several reasons. The object is humane and we are a humane people. They are our allies, our neighbors and our friends. We want to help them for the sake of the good name of Canada. It would be a good thing in the interests of our foreign trade to have our agricultural machinery, furniture and household utensils known in these lands. And it would be a good thing in all our international relations to have it known that the dairymen of Canada gave something, a good thing to have it known that our grain growers gave something, a good thing to have it known that our live stock men gave some-

thing, and that our poultrymen and fruit-growers have given something. We want for Canada a place among the nations, on behalf of our farmers, which will be in keeping with what our sons and brothers have done and won on the fields of battle.

For all these reasons may I suggest that you think kindly of having the proceeds of at least one day's milk set aside for these farmers who have suffered. You will never miss it; it will be laid up where neither moth nor rust doth corrupt, and where thieves do not break through nor steal. It will be to our everlasting credit.

Under these circumstances I beg to read the following resolution:

Moved by the PRESIDENT (J. N. STONE) seconded by G. G. PUBLOW and resolved, That the Dairymen's Association of Eastern Ontario, in annual convention assembled, records its deep sympathy with the farmers in the countries of the Allies, who have suffered the destruction of property through the invasion of their countries by the enemy forces, and recommends to all dairymen that they should contribute the value of at least one day's milk to the Imperial Agricultural Relief of the Allies Committee, to aid the farmers in the devastated regions to obtain seeds, machinery, live stock, furniture, utensils, clothing, etc., whereby they may be assisted to go on with their work as farmers as soon as the enemy has gone. *Carried unanimously by a standing vote.*

SECRETARY'S REPORT.

T. A. THOMPSON, ALMONTE.

As Secretary of this Association, my report is never very elaborate. It is different from the Western Association, where the secretary, Mr. Herns, is also the chief instructor. Mr. Publow will deal with the other part of the report.

Personally, I wish to tender my sincere thanks to the President and Directors for the assistance they have rendered me during the past year, and for their courtesy and forebearance at all times during the past year.

It affords me very much pleasure to present my report for the year 1916; and permit me to say at the outset that the Dairy industry of this province has during the past year suffered an irreparable loss by the death of the Hon. James Duff, Minister of Agriculture. His untiring efforts to place the dairy industry on a higher level and his whole-hearted sympathy with every move that tended to better the general conditions have left their indelible imprint upon all who are connected with the business in this country.

Owing to the war conditions and the abnormal demand for food stuffs, the dairymen of Eastern Ontario have had the best year financially in the history of the association; and it is very gratifying to know that the quality of the goods has maintained that high standard for which this part of the province is noted.

Considerable commotion has been caused by the new Dairy Standards Act; in fact nothing that has happened in connection with the dairy industry in the last quarter of a century has stirred the dairymen to such a depth, the clause in the Act making provision for the paying for milk delivered at the cheese factories by the butter-fat test being the principal bone of contention.

The provisions of this Act were the chief theme of discussion at the annual district dairy meetings held throughout Eastern Ontario during the months of November and December. These meetings were exceptionally well attended. Mr. G. G. Publow, Chief Dairy Instructor, in a masterly manner dealt with the provisions of the new Act and its bearing upon the dairy industry; Mr. Glendinning took up the practical side of the business. These meetings have become one of the best sources of disseminating useful knowledge that we have in Eastern Ontario.

The dairy exhibit held in connection with this Convention has been a marked success. The high standard of the goods on exhibition is a credit to the makers of Eastern Ontario, and an object lesson to all who have been privileged to examine them; and I trust that the producers and manufacturers will unite in a determined effort to have the butter and cheese manufactured in 1917 just a little better than it has ever been before. Let us bear in mind that the cheese in large quantities goes to feed our boys in the trenches, and they deserve from us the very best that we can give them.

The Directors appreciate very much the assistance the Association has always received from the Ontario Department of Agriculture, and also the Department of Agriculture of the Dominion, and wish to express their gratitude therefor.

Personally, I wish to tender my sincere thanks to the President and Board of Directors for the assistance they have rendered me in the discharge of my duties as Secretary.

REPORT OF DAIRY INSTRUCTOR AND SANITARY INSPECTOR.

G. G. Publow, Kingston.

I take pleasure in submitting my fourteenth annual report as Chief Dairy Instructor and Sanitary Inspector in Eastern Ontario for the season of 1916.

Following the custom of former years, a short, special course of instruction was given the instructors at the Kingston Dairy School. This course has proved to be very helpful to the instructors and is much appreciated by them.

The work of instruction was conducted along similar lines to that of last season, 21 instructors being engaged in the work of instruction and inspection, while Mr. L. A. Zufelt, Superintendent of the Kingston Dairy School, acted as instructor for all of the creameries and his report on same is as follows:

Creamery Report.

Number of creameries in operation	38
" using pasteurizing cream vats	12
" receiving cream in tanks	2
" receiving cream in large cans	13
" receiving cream in individual cans	23
" using pipette for testing	23
" using scales for testing	15
Range of moisture found in butter	13.6 to 21%
Average moisture from	14 to 15.5%
Number of samples over 16 per cent.	1
Total number of patrons supplying cream	5,833
Increase over season of 1915	17%
Total pounds of butter manufactured	3,732,254
Increase over season of 1915	30%
Average selling price per pound	33c.
Increase over 1915	5c.

The quality of the butter so far as could be judged from an examination at the creameries was very good, but as most of the butter is put up in prints and disposed of within a few days after being made, it was not possible to form a reliable opinion of its keeping qualities. Only a small percentage of the butter is packed in solids, the balance being mostly disposed of by the manufacturer direct to the trade without going through the hands of the large dealers.

The chief defect in the creamery industry of Eastern Ontario is in the general average condition of the cream as it reaches the creamery. The creameries, with perhaps two or three exceptions, are kept in a fairly sanitary condition, and the makers are doing fairly satisfactory work.

The majority of the creameries are not as well equipped and constructed as one would wish, but in this connection I am pleased to note a gradual improvement, as we now have twelve out of a total of thirty-eight, equipped with modern pasteurizing and cooling vats, a considerable increase over last season.

Regarding the quality of Ontario butter as determined by the awards obtained at the Annual Expositions at Toronto and Ottawa, whilst we deplore the unfavorable showing obtained, we should not overlook the fact that the prize winners are confined to comparatively few creameries, where conditions are more favorable for the production of a higher quality. There is no question but that a higher quality of butter can be produced from sweet cream properly pasteurized and ripened than can be obtained from the average cream that is supplied to Ontario creameries, and this fact has been so forcibly impressed on our makers the last few years that they have simply quit showing their butter, where it comes into competition with the product of the sweet cream creameries. This does not mean that we are going back, but that other sections of Canada are going ahead faster than we, with the net result that our showing is made more unfavorable each year.

Grading of Cream.

This year we introduced cream grading at the creamery operated in connection with the Eastern Dairy School, which proved an entire success. The patrons were perfectly satisfied with the result, and no difficulty whatever was experienced.

We established two grades for a start. First grade being defined as sweet and clean in flavor, and second grade as being sour or slightly sour, but otherwise clean in flavor. A difference of 2 cents per pound of butter fat was made between the two grades.

Of the total cream supply for the six months, only 6½ per cent. was placed in second grade. When it is considered that nearly 20 per cent. of the cream supplied is brought in by train, the net result is a remarkable showing for one season's trial.

We are more firmly convinced than ever of the value of cream grading, and our experience at the Dairy School simply emphasizes the fact that the farmers generally will take advantage of the opportunity afforded them of obtaining more money by sending in a better quality of cream.

In closing, I can but repeat what has already been said, that in order to make more rapid improvement, some system of grading of cream should be introduced as soon as possible. This together with the installation of modern pasteurizing machinery should in a few years place us again in the lead for quality.

REPORT ON WORK OF DAIRY INSTRUCTORS FOR

Instructors and Groups.	No. of factories in group.	No. of full day visits.	No. of call visits.	No. of patrons.	No. of patrons visited.	No. of samples of milk tested for adulteration.	No. of samples deteriorated.	No. of sediment tests made.	No. of factories pasteurizing whey.	No. of factories making whey butter.
Almonte—										
W. J. Ragsdale	43	48	192	1,833	47	1,983	1	627	0	4
Alexandria—										
C. B. Larry	39	40	240	1,148	23	1,270	3	291	0	0
Brockville East—										
A. H. Wilson	45	47	183	1,244	34	972	0	776	15	6
Brockville West—										
S. S. Cheetham	42	51	264	1,087	60	1,187	1	85	11	17
Brockville North—										
P. Nolan	45	51	191	1,145	10	977	3	565	0	0
Belleville—										
Hugh Howey	35	74	268	1,472	123	1,972	1	956	4	0
Cornwall—										
J. Buro	38	58	380	1,270	90	946	4	435	19	1
Campbellford—										
R. T. Gray	37	67	175	1,507	57	2,372	3	235	1	0
Finch—										
T. J. Ellis	39	46	274	1,153	6	1,013	0	120	0	5
Kemptville—										
W. G. Gardiner	40	76	256	1,554	25	1,169	1	125	1	4
Kingston—										
Fred Clark	44	54	204	1,324	27	1,412	1	392	2	7
Peterboro' and Lindsay—										
R. W. Ward	37	66	97	1,869	121	1,215	2	156	5	8
Madoc—										
Chas. Linn	38	96	153	1,068	63	1,465	2	735	4	0
Morrisburg—										
C. W. Norval	43	62	204	1,358	26	1,649	12	300	0	25
Ottawa—										
Jas. Mitchell	38	72	233	1,181	17	1,256	1	540	1	5
Ottawa East—										
A. McKinley	45	46	281	1,365	5	1,321	0	262	0	2
Perth—										
J. H. Echlin	41	52	165	1,743	164	1,121	0	148	0	8
Picton—										
Herb. Brintnell	32	52	191	2,357	64	2,397	12	164	14	8
Plantagenet—										
Jos. McAllister	40	68	186	1,165	18	1,217	7	508	0	1
Napanee—										
G. H. Bensley	45	56	202	2,772	42	3,815	6	145	2	4
Vankleek Hill—										
G. H. Barker	43	46	349	1,010	43	1,080	2	496	2	0
	849	1,228	4,688	30,625	1,065	31,809	62	8,047	81	105

SEASON OF 1915—EASTERN ONTARIO CHEESE FACTORIES.

Average % of fat in all whey tested.	No. of factories paying by test.	Average % of fat in all tests made.	Lbs. of milk delivered from May 1st to November 1st.	Lbs. of cheese made from May 1st to November 1st.	Average lbs. of milk to make a pound of cheese.	No. of factories with cool curing rooms.	No. of factories which made improvements in buildings or plant.	Estimated expenditure, including new buildings.	No. of new factories built.	No. of new silos built.
								$		
.21	3	3.63	52,551,274	4,888,429	10.75	3	43	5,000	0	29
.19	8	3.60	37,247,409	3,586,505	10.38	0	17	45	0	30
.21	2	3.52	55,395,786	4,960,286	11.16	1	21	2,350	1	16
.25	4	3.45	57,035,473	5,074,878	11.24	3	14	2,575	0	0
.24	0	3.52	56,502,593	5,164,858	10.93	2	10	1,700	1	5
.24	0	3.59	49,641,611	4,475,089	11.09	6	17	6,500	0	32
.25	12	3.78	49,582,023	4,666,041	10.62	1	38	7,360	1	71
.22	0	3.43	45,184,482	4,006,926	11.27	3	19	2,775	0	37
.22	6	3.42	42,702,516	3,910,486	10.92	1	21	5,500	1	54
.24	13	3.48	48,275,800	4,335,861	11.11	1	23	5,000	1	77
.23	1	3.54	44,251,232	3,792,749	11.14	0	12	8,207	3	11
.23	11	3.62	39,942,854	3,565,766	11.20	12	37	2,855	0	78
.20	0	3.65	40,241,170	3,646,491	11.03	3	12	4,337	1	4
.23	1	3.54	59,378,640	5,481,242	10.83	1	30	2,500	0	46
.23	14	3.51	39,194,260	3,560,515	11.00	1	16	9,136	3	37
.26	8	3.55	40,332,193	3,785,531	10.65	0	18	6,352	2	20
.22	0	3.52	46,692,144	4,300,509	10.85	1	18	6,150	1	4
.23	0	3.60	62,690,745	5,558,991	11.27	12	5	300	0	25
.23	1	3.73	22,314,689	2,165,175	10.30	0	18	3,447	1	9
.22	0	3.59	83,619,131	7,682,505	10.80	5	10	3,560	0	12
.22	2	3.60	37,123,225	3,433,816	10.80	0	12	1,650	0	10
.23	86	3.56	1,007,899,250	91,042,642	11.07	56	411	87,299	16	607

Cheese Report.

Cheese Factories.—There were 849 cheese factories in operation in Eastern Ontario this year, or two more than last season. These factories received from the instructors 1,228 full day visits and 4,688 call visits, 411 factories made improvement in building or plant and 16 new factories were built, the estimated expenditure, including new buildings, being $87,299. While the general appearance and condition of the factories is showing improvement, there are still a number, however, that are not very creditable, and will have to be improved if they continue to operate; 105 factories made whey butter, and the total pounds of butter made by same from May 1st to November 1st, was 353,760 pounds.

Eighty-one factories pasteurized the whey, the average acidity of the pasteurized whey being .37 per cent. as compared with 1.02 per cent. in the unpasteurized.

Eighty-six factories paid for milk according to quality. This is thirteen more than last season; 45 paid by straight butter fat and 41 by the plus 2 method.

Patrons.—The number of patrons supplying milk to the cheese factories was 30,625, being an increase of 1,018 over that of last season; 1,065 patrons were personally visited by the instructors with a view of improving the milk supply, and in nearly every case they showed a willingness to follow suggestions offered.

Number of Cows.—Milk was obtained from 276,132 cows. The average amount of milk per cow for the six months was 3,650 pounds, an increase of 375 pounds per cow over 1913.

Milk Delivered.—The amount of milk delivered to the cheese factories from May 1st to November 1st was 1,007,899,250 lbs., and the amount of cheese manufactured from same was 91,042,642 lbs., this being 5,684,880 lbs. more than for the same period last season. This with an average selling price of 18½ cents per lb., as compared with 15 cents for the same period in 1915, gives an increase of about $4,000,000 to be distributed among the patrons.

Milk Testing.—31,809 samples of milk were tested for adulteration, and 62 were found to be deteriorated. After an investigation was made, 48 of these were placed in the hands of the official prosecutor to be dealt with, and fines ranging from $10 to $50 were imposed in each case, the total amount from same being $1,715. This amount was equally divided between the Dairymen's Association and the factories in which the offences were committed.

Sediment Tests.—8,047 sediment tests were made this year. These tests are proving to be a strong factor in securing a cleaner milk supply.

Quality of Cheese.—The quality of the May and June cheese was exceptionally fine also that of the fall make, but during the months of July and August, which were very trying owing to the extremely hot and dry weather, a large percentage of the cheese were more or less defective, and although a number of claims were made, there would have been many more had it not been for a rising market. On the whole, I consider the quality to have equalled that of former years.

Rennet Problem.—One of the chief problems the makers had to contend with was the rennet question, there not being enough of the standard makes to supply the demand, and it looked at one time as though some of the factories would have to close for the want of it. Here let me express my appreciation to Mr. Ruddick, Dairy Commissioner, members of his staff, and others for the prompt and effective measures taken to relieve the situation.

Quite a number of substitutes were placed on the market, the principal one

being pepsin, and as some of the brands were of variable strength a lot of confusion was caused, and in some cases serious loss as well. In other cases owing to the higher price of rennet, factorymen tried to do with a smaller quantity than was necessary to do the work properly, and the result was a greater loss of fat in the whey, and was no doubt largely responsible for the higher average in pounds of milk required to make a lb. of cheese, 11.07 lbs. being the average this season, which is considerably greater than that of any previous year. Makers should use sufficient of the coagulating agents to insure proper coagulation of the milk in a reasonable time. It will be safer to determine the quantity to use from its action on the milk rather than to depend on the directions given by the manufacturer.

Care of Milk.—To further confirm the results of experiments conducted during the season of 1915, *re* the relative value of cooled milk versus uncooled milk, seventeen of the instructors conducted similar experiments during the past season. The results were even more convincing than before, showing that milk which is properly cooled and cared for will produce more cheese from a given quantity than uncooled milk. In summing up the experiments conducted by the instructors during the past season, it is shown that it took 11.51 lbs. of uncooled milk to make a lb. of cheese and 11.04 of the cooled milk, a difference of nearly half a pound, and I would strongly advise every cheesemaker to encourage his patrons to cool the night's milk to at least 65 degrees immediately after milking. If this is done, it will result not only in a better yield of cheese, but also some of the common defects now found in the cheese will be overcome.

General.—As the farmers are greatly interested at the present time in the proposed system of paying for milk at cheese factories according to the butter-fat content, the instructors made an individual test of all the milk sent to 780 factories with the object of finding out to what extent the percentage of fat varied in the different factories, and the results showed an average variation of about 1 per cent., while some individual lots showed a variation of from 2.5 per cent. to 6 per cent.

With a view of obtaining some further information regarding the value of milk containing various amounts of fat as determined by the weight of cheese made therefrom, experiments were conducted by Mr. Zufelt, Mr. Cheetham, and myself, during the past season, at Rockport cheese factory and at the Kingston Dairy School. Milk varying in fat from 3.2 per cent. to 5.5 per cent. was used, and in the case of the milk manufactured at the Dairy School, special care was taken to see that (as far as possible) it was cooled and cared for in the same manner; 100 lbs. of milk was used in each case, and in all 18 cheese were made, varying in weight from 8 lbs. to 13¼ lbs. The 8 lbs. were obtained from the 3.2 per cent. milk, and the 13¼ lbs. from the 5.5 per cent. milk.

The results obtained in this work simply confirm the work done in former years with larger quantities of milk, and it would appear as though the system of paying for milk for cheesemaking at a uniform rate per 100 lbs. is a very unfair one, and that either of the methods proposed in the new Dairy Act will come much nearer to giving each patron the actual value of his milk.

The weakest points in connection with the manufacture of our cheese are, 1st, lack of first class makers to manage the factories; 2nd, lack of facilities for the proper control of the temperature of the curing room; 3rd, lack of sufficient competent help to enable the makers to do the work as it should be done, and the over-ripe condition of some of the milk during the warm weather.

As in former years, I have prepared a tabulated statement of the work in each section, which will be found in the report of this meeting.

CHART No. 2.

VALUES OF 100 LBS. OF MILK CONTAINING VARIOUS AMOUNTS OF FAT, AS DETERMINED BY THE WEIGHT OF CHEESE MADE THEREFROM.

Eastern Dairy School.

Date of Manufacturing.	Fat.	Casein.	Weight of Cheese.	Value at 20c. lb.	Values as determined by			
					Fat + C.	Fat.	Fat + 2.	Pooling.
	%	%	lb.	$ c.	$ c.	$ c.	$ c.	$ c.
September 26th	5.5	2.4	13¼	2 65	2 79	2 78	2 60	2 20
	3.2	1.8	8⅜	1 75	1 61	1 62	1 80	2 20
September 27th	4.2	2.0	11½	2 30	2 25	2 28	2 21	2 08¾
	3.5	1.8	9⅜	1 87½	1 93	1 90	1 96	2 08¾
September 28th	4.0	2.1	10⅝	2 12½	2 09	2 11	2 05	1 95½
	3.4	1.9	8⅞	1 78½	1 81	1 79	1 85	1 95½
October 5th	5.4	2.3	13⅛	2 62	2 62	2 71	2 56	2 21
	3.4	1.9	9	1 80	1 80	1 71	1 86	2 21
	4.2	.....	11½	2 30	2 17	2 25	2 14	1 94
	4.0	.....	10⅝	2 12	2 14	2 14	2 07	1 94
	3.5	.....	9⅜	1 87	1 85	1 87	1 8	1 94
	3.4	.....	9	1 79	1 85	1 82	1 86	1 94
	3.4	.....	8⅞	1 79	1 85	1 82	1 86	1 94
	3.2	.....	8¾	1 75	1 75	1 71	1 79	1 94
Totals	21.7	.....	58⅛	11 62	11 61	11 61	11 61	.....
Average dif. per 100 lbs. milk				.....	4½c.	3c.	7c.	18c.

CONCLUSION.

Never in the history of cheese-making were such high prices paid for cheese as during the season of 1916, and not since 1912 was the production so high, and we cannot help but think what a big thing for Canada the dairy industry is, when we realize that it meant an income of nearly 17 millions, to Eastern Ontario, for the six months (May 1st to November 1st) for cheese alone.

In closing I wish to thank the instructors for their hearty co-operation in the work of the past season. They have done their best to improve the quality of the dairy products in their respective districts, and each year shows some progress being made. I also wish to thank the directors of the Association and the cheese merchants for their hearty support in all matters pertaining to the work.

W. BERT. ROADHOUSE: It is with a great deal of diffidence that I rise before you this morning to open the discussion on this most momentous question. As your secretary has said, the Dairy Standards Act has given a new vim and interest to the dairy meetings throughout the province. It was not to be expected that the conditions which had prevailed for thirty years could be set aside without some degree of pain. I appreciate that fact, and in the few remarks that I am privileged to make, I will endeavor to step lightly, to speak softly, and to soothe rather than ruffle the troubled breast. It is my hope, and I am sure it is also the desire of the Executive of this Association, that this subject should be fully, freely, and frankly discussed from every standpoint at which it can be looked, and it is therefore my purpose to discuss it from the standpoint of the Department of Agriculture. As you are no doubt aware, the Ontario Department of Agriculture exists to give organized direction and legislative effect to such plans and propaganda as

may be considered to be of most interest to the agricultural community of the Province, and through that contribute to the welfare of the nation as a whole. Acting from that standpoint only, this question was taken up. For many years the question of payment for milk at cheese factories has been discussed. The Babcock test was presented to the industry 25 years ago, and since that time we have had a new point of view. There have been great differences of opinion as to the different methods, but there was no difference of opinion that the pooling system was the farthest from perfection. That being the case, the Minister of Agriculture, acting through and with his dairy experts, took up the subject of the best way of bringing about a change. It was said that if either one of two methods was adopted it would be an improvement on the method that had been in vogue. Accordingly the then Minister of Agriculture introduced what is known as the Dairy Standards Act. It was sent to the Agricultural Committee for discussion, and a special session of that committee was held to discuss this question. Mr. Publow and Mr. Herns were heard, and the members indulged in a full and free discussion. From that committee it went to the House, and from the House to the Statute Books of the Province, with little or no opposition. After getting this far the next thing was to carry on a campaign of education. The Bill was printed in pamphlet form and a copy placed in the hands of every patron from one end of the Province to the other. Throughout the summer the matter received further consideration from time to time from the Minister, particularly the point in the carrying into effect of the law. The last official act of the Minister in his office in Toronto was to send out instructions to the effect that the testing under this Act would be done by the officers of the department and without expense to the patrons.

I would like to tell you the main reasons which influenced the Department and the Minister in arriving at this legislation. First, I believe that the principle involved in this legislation is absolutely sound. If we want quality we should pay for quality. This principle is recognized in many other agricultural matters. I would like to point out that the principle of quality is not entirely foreign to the cheese business. When a buyer goes into a factory, does he ask how much cheese have you there? And then say "I will give you the prevailing price, as cheese is cheese and you are entitled to so much per pound for all you have." I think not. He tests your cheese, and if it is not up to a certain quality he cuts the price. This past summer I took an opportunity of visiting a number of factories, and I met one maker who had just recently been faulted to the extent of $40 on account of the buyer finding that his cheese was not up to standard. I do not mean to say that the grading of cheese is done as extensively as it might be, but I do say that the principle is recognized.

In passing, I note that this legislation is in accord with the trend of the times. In all agricultural matters at the present time, the marketing end is receiving consideration. We have at the Department received letters from all parts of the country, and from many parts of the United States, in reference to this particular legislation. One and all strongly endorse the legislation. "I congratulate you on the progressive stand which the Province of Ontario has taken in this matter," is a phrase which so many of them used in writing to the late Minister of Agriculture. The following sentence is contained in a letter received from the director of the largest dairy school in the Province of Quebec: "It is absolutely what we want for our Province of Quebec, and I hope it will be a great help to us before Parliament at the next session." That is what Quebec says, and that is their view of the matter.

Then I would note that across the line in New York State, a great many of the dairies have already started paying for milk, even for city use, on the basis of quality. Not only that, but at the fortieth annual convention of the New York State Dairymen's Association held only a few weeks ago, it was resolved, according to the report in *Hoard's Dairyman*, to favor the butter-fat method of paying for milk, and a State law requiring pasteurization of whey and skim milk when returned from the factory to the farm. That is the view which they take over there. In discussing this matter with a prominent farmer in New York State a few weeks ago, I asked him what effect he thought it would have, and particularly what effect he thought it would have on the breeding industry, and he said he believed it would have a most beneficial effect. So I say this legislation is in accord with the times, and Ontario should lead in this matter.

These are two of the principles which actuated the Department in this legislation, and without going further into the details along that line I would like to note some of the objections which have been raised.

I am aware that many objections have been raised, and some of them will be carefully considered. Some of the objections have been characterized more by imagination than anything else. With these imaginary objections it is not my purpose to deal at the present time. Some say the principle is all right, but that it won't work; that objection would be fatal if it could be sustained. The faith of the Department that it will work is based on the fact that it is working. Practically ten per cent. of the cheese factories in this province have been paying by test, and that is the best proof that it will work out in practice. Another objection that is raised is that the legislation is arbitrary. All legislation is arbitrary, if you wish to use that term. I have sometimes heard that the legislation excluding oleomargarine is arbitrary, and yet that legislation has much to support it. The objection that it is arbitrary is not good so long as it is fair to all parties alike. Then it is objected that the testing may not be done right. I referred before to the fact that the Minister of Agriculture on his last day in the office had given instructions that the testing should be done by the officers of the Department. That means that the testing will be done in the East under the supervision of Mr. Publow and in the West under the supervision of Mr. Herns. That is the best guarantee that we can give that every human effort will be put forth to see that the testing is done honestly, fairly and squarely, and that a square deal is given to every patron in the province.

Another objection is, we did not ask for it and we are not ready for it. It reminds one of the shy young girl who said "This is so sudden," and if he had not proposed she would have said "He is a slow old thing." You see the predicament the Department was in between these two fires. After so many years of discussion I do not think the Department can be accused of having broken the speed laws. But how are we to gauge public opinion?

I think the agricultural interests of this Province are served by a press which is as capable, as far seeing and as fearless as the press of any Province or State on this continent. There is no doubt but what the press is an important factor in the development of the agricultural welfare of this province. What has the press to say on this matter? In every case the press has asked for it and has approved it, and has declared that it is what had been long needed, and will be a good thing for the dairy interests of the province.

There is a difference between the passing of an Act and putting it in operation. It was realized that in a matter of this kind it was necessary to have a cam-

paign of education, so that every man interested could express his views. Having deferred the operation for a year at least after passing, and having facilitated the calling of meetings, so that views could be expressed, I do not think this legislation is open to any charge that it has been sprung suddenly or advanced without giving every opportunity for discussion and consideration.

In conclusion, I would like to say that in all this legislation we are looking to the future and planning for the years that are to come. Sooner or later this war will be over, and we all pray that it may be soon. With the conclusion of the conflict there will be dislocation of trade conditions. There will be keen competition for the trade, and market channels then determined will prevail largely for the next ten or twenty or fifty years. In that competition I think the cheese industry of Ontario will survive. I have greater confidence that the more we build that industry on a solid basis of quality the more certain and sure will be its advancement. With these convictions, therefore, the Department of Agriculture comes before you to-day and submits to you the best information gained by men who are experts in the dairy business; men like Publow and Herns and Zufelt and Ruddick and Barr, and others, who for years have worked at this industry with but one object in view; the betterment of the industry in Ontario and the Dominion of Canada.

Furthermore, we say that the testing will be done by the Department and at the expense of the Department, and without direct expense to the producers of this Province. Having done all this, I feel we are justified in the conclusion that we have done our part, and that the matter is now in the hands of the dairymen themselves. Without your co-operation little can be done, with your co-operation great good can be accomplished.

I have, therefore, great pleasure in opening the discussion on this matter, and in expressing the hope that there will be frank and full discussion at this time.

To the dairy expert, to the producer and to the makers, I would say, "Go to it," and may right and truth triumph and righteousness prevail throughout the land.

Mr. A. A. Ayer, Montreal, Que.: I want to say that I have never read this Dairy Act, but I cannot conceive that it is perfectly fair that a farmer taking 4½ per cent. milk to the factory would have to mix it with 3 per cent. milk. That certainly is not a fair deal. I do not think I need to say anything more about the Dairy Act. I want to post the makers and farmers on one point: Here is a piece of cheese made from high testing milk, and here is a piece of cheese made from 3½ per cent. milk, and that is the cheese they want in England. I cannot get as much money for the cheese made from the high testing milk as I can from the other. You say, "Why not? It has got more butter fat in it?" Of course it has a great deal more butter fat.

Mr. Publow: I think you are mistaken.

Mr. Ayer: As a matter of fact it is the casein. I just want to warn you against having all your cows give 4½ per cent milk. I do not believe you are going to gain anything by it. I prefer a cow that gives a large quantity of 3½ per cent. milk to a cow that gives a small quantity of 4½ per cent. milk. I am not complaining of the Dairy Act in any way, because it certainly is unfair to mix 4½ per cent. milk with 3½ per cent. milk as it has been done in the past. I want the farmers who are here not to make the mistake of changing the class of cows they keep. The point I want to make is that you are going to lower the standard of the cheese for the English market if you make too violent a change.

I am not disputing anything that Mr. Publow or any of the others may say, I am just pointing out the stubborn fact, so that you will know what you are up against. I do not want to discourage any dairyman from keeping Holstein and Ayrshire cows. I am simply giving you this illustration. Here are two different classes of cheese—one made from 4½ per cent. milk and the other from 3½ per cent. milk —and one sold for more than the other on the English market. I suppose the reason is that the casein is in the one and not in the other.

L. A. ZUFELT, Superintendent, Kingston Dairy School: I am sure that the audience realizes the injustice of paying for milk by the pooling method. That has been forcibly brought before you for the past twenty years, and what I have to present before you this morning is nothing more than repetition of what you all know, and what you all believe. I have no doubt there are a few who are still of the opinion that one hundred pounds of milk is worth so much no matter what the percentage of fat. We have often been asked how many pounds of butter will a gallon of cream make? All cows do not give the same quality of cream. One hundred pounds of one kind of milk will make more cheese than one hundred pounds of another kind of milk. This summer Mr. Publow and myself were asked by the Department to do some additional work along this line, as to the value of milk for cheese making. The work that we did leaves out the question of quality altogether. We stayed four days at the chese factory at Rockport, we made the cheese there openly and above board, and we asked the patrons to come there and see the cheese made, and a number of patrons did so. Later we repeated the work at the Dairy School at Kingston. We bought one hundred pounds of milk from different farmers, and we endeavoured to get as wide a variation of milk as possible, and we got as high testing milk as possible for one particular reason. We knew that in the work we have been doing that the statement has been made that when milk goes over a certain percentage of fat that the fat is not all recovered in the manufacture of the cheese, and that the excess of fat goes out in the whey tank. I am sorry to say that we have some cheesemakers who tell their patrons that is the fact. We got some milk testing as high as 5.5 per cent. fat, and from one hundred pounds of that milk we secured 13¼ pounds of cheese. We got milk testing as low as 3.2 per cent., that is the lowest testing milk we were able to secure, and we only made 8 pounds of cheese. There we have a difference from 8 to 13½ pounds of cheese from one hundred pounds of milk.

We afterwards tested these cheese for fat and moisture, and what did we find? We found invariably that the cheese made from the lower testing milk had a higher percentage of moisture and a lower percentage of fat. The cheese made from the richer milk contained a higher percentage of fat and a lower percentage of moisture. There was about two pounds more solid matter per one hundred pounds in the cheese made from the higher testing milk than was in the cheese made from the lower testing milk. The cheese made from the richer milk if sold on their merits would command the higher price, notwithstanding what Mr. Ayer said. The highest price paid for cheese made in England is from milk that has fat added to it. It is made from the morning's milk with the cream of the evening milk added to it, and it is known as English Stilton Cheese.

A MEMBER: We take from that that you contradict Mr. Ayer's statement.

MR. ZUFELT: What Mr. Ayer wanted to say was this: That you should not use Jersey cows for cheese making purposes, but he did not succeed very well in expressing what he wanted to say. According to the result of the test made by

the various instructors as to the highest and lowest testing milk in the factories, it has been found that it only varies about one per cent., and we must deal with the question as we find it. This milk testing 5 per cent. is not sent to the cheese factory; it is used for making butter. The conditions that we are dealing with to-day are milk producing a variation of one per cent. in the fat content. We are not dealing with high testing milk, because it is not sent to the cheese factory. I have before me cheese made from one hundred pounds of milk and they vary in weight from 8¾ to 13½ pounds. They were each made from one hundred pounds of milk. Now I would like to know whether there is any difference in the value of these one hundred pounds of milk? Is there any reason why the man who furnishes milk that will make 13½ pounds of cheese should receive the same price for his milk as the man who produces milk that only makes 8¾ pounds of cheese? At one meeting a patron said, "My milk is not the lowest testing." and I said, "Then you do not object to dividing up with your neighbour?" and he said "No." I said "I am glad to know that we have philanthropic men in the country." Then, I said, "Supposing your milk is the milk that tests the lowest, will you ask the other fellow for some of his money? Would you pool the number of cows that you have and have the milk paid for by the number of cows you keep? Here is one man who has 99 cows and another who has only 15. Would you divide the money up in proportion to the number of cows? You are justified in the one case just as much as you are in the other." This work has been done as honestly and fairly as we know how to do it. The cheese were made in the best way that they could be made. This is not merely one test, but it is a repetition of the work that has been done for the past fifteen years. I can make this statement fairly: That where there is an increased percentage of fat in the milk, all conditions being equal, there is an increased yield in the cheese from the milk. To show you the difference in the actual value—this cheese is worth $2.50 and this $1.75, or 55 cents difference in the value of one hundred pounds of milk. Surely that is a most unjust way to divide the proceeds. There was an agitation a few years ago to have the cheese makers weigh the half pounds of milk. If he makes a mistake in 5 or 10 pounds of milk you make a kick at once, yet there are some of you who may be losing 18 cents on every one hundred pounds of milk you send to the cheese factory, and you are not saying one word. Now I think I have said sufficient to convince any sensible man that this pooling system is absolutely wrong and should be done away with at once.

Q.—Would it be possible that this one hundred pounds of milk was produced from four different cows?

A.—Yes. It might require four cows to produce one hundred pounds of this milk, and two cows might produce it just as well.

Q.—Is it just to ask a man to keep four cows when two will do the work?

A.—We are not asking people to produce less milk.

Q.—The people have been educated to keep cows that will produce a large quantity of milk regardless of test, and if you pay according to test they will change to cows that will not produce as much milk.

A.—I disagree with that statement. We are not asking farmers to produce a less quantity of milk. We want to encourage quantity as well as quality. What are the breeders of pure bred cattle trying to do? Are they not trying to increase the quality of the milk as well as the quantity?

Q.—Is not there a danger there to the breeding industry? Won't the majority cross their cattle with the Jersey and other high-testing breeds?

A.—You may have a cow that gives only 3 per cent. milk, and she may be the most profitable cow you have by reason of the large quantity she gives. It is the total quantity of milk that the cow gives that determines her value. The curse of the dairy business to-day is the want of discrimination in the value of our products. We have not been paid according to the quality of the goods we have produced, and that has been keeping back development. When we are all paid the same price regardless of quality, we have a tendency to grade down, and if we paid according to quality we would grade up. The proper enforcing of the Dairy Standards Act will do more for the upbuilding of the dairy industry and for the farming community than all the legislation along dairy lines that has been passed in the last twenty years.

Q.—How does the quality compare in the cheese made from the high testing milk and the cheese made from the low testing milk?

A.—Mr. Ayer will admit that you can make finer cheese from 4 per cent. milk than you can from 3 per cent. milk.

MR. AYER: No, I will not admit that. I am not talking from a technical point. I am talking from my own prices.

MR. ZUFELT: You can make much finer cheese from 4 per cent. milk than you can from 3 per cent. milk. Everyone who knows anything about the manufacture of cheese will admit that statement is correct.

MR. AYER: There is fully a half cent. difference in the selling price of these cheese I have here.

Q.—What difference did you pay the Ontario or Quebec farmer?

MR. AYER: I should say the average in Ontario was fully a quarter per cent. above the price paid in Quebec. Do not make any mistake, I am not saying a word against the Dairy Act, but I think you ought to know what kind of cheese brings the best money.

MR. PUBLOW: There is a point here that should be put right. I think Mr. Ayer has been misunderstood. What Mr. Ayer fears is that you are going to keep cows that will produce less milk. He thinks you will breed cows that will produce richer milk but in a less quantity. He need not worry much about the quality of the cheese in that event.

MR. AYER: Is there a man in Ontario that can go to Quebec and produce a different class of cheese?

MR. PUBLOW: Yes, he will call for different treatment of the milk. Rich milk calls for different treatment.

MR. AYER: Why does not the end of November cheese bring the same price as September cheese?

MR. PUBLOW: Because in the fall of the year when the weather is cold they do not pay the same attention.

A MEMBER: These cheese that you have on the platform were made by an expert, let Mr. Ayer judge them.

MR. PUBLOW: You need not fear the quality going back if you, the managers of factories, pay by test. Cows that produce milk testing 3.5 per cent. fat and 4 per cent. fat have given as high as 10,000 lbs. of milk in the season. That shows that it is quite possible to have cows that will produce a large quantity of milk and also test fairly high. I would urge every patron to produce quantity and quality. This year we fined 49 people for adulterating their milk by putting in water. Do you think it is fair to pay these men who put water in their milk the same price as the man who produces high testing milk? One man who pro-

duces milk testing 4 per cent. puts in water and reduces it to 3½ per cent. Is that fair, I think not.

If I thought this would result in the mixing of breeds I would say at once: "Do not have anything to do with it. Stay by the best breeds and you need have no fear."

THE CHAIRMAN: Some dairymen have complained that they have not had a chance to express themselves. We will now give anybody who so desires an opportunity to say what they think about this matter.

A MEMBER: Why don't they tell us what they want us to do?

MR. AYER: Unless I be misunderstood, I would like to say that I do not think there is really any difference between the experts who have spoken and myself.

A MEMBER: There are two cheese, one made from 3.2 per cent. milk and the other made from 4 per cent. milk. I happened to be at Centreville at the meeting and I am here to-day. According to the test made at the various factories there are few patrons who produce 4.2 milk, and there would be very few of the high testing cheese made in the Province of Ontario. If you take an average of 3½ per cent. milk you will strike the average of the country. Now I think the fair thing to do is to leave this matter as it was. You will find that the farmers will have their rights. If this Act is put in force we will have to put up a lot of ten dollar bills to win out in this cheese testing game. There were a few men who studied out this scheme and it was put before Parliament. I would like to know whether a vote was ever taken on the matter? If there was not, why not? It must have come before the House, and these men must have sat there and took no interest in it, it must have been done so that the farmers could not hear about it. They come here before us now with a sugar-coated pill, but I want to tell you that the sugar will all melt off before spring. This Act might work in some of these one-horse places in the west, where they all draw their own milk, but it won't work in the East. This Act provides that we must pasteurize the whey or lose it. If we have to hire a second lot of milk drawers it will be very expensive.

MR. W. J. PAUL, M.P.: I am here for the same purpose as the majority, to listen and to learn and to take part in the discussion. The most important question before us at the present time is the Dairy Standard Act. I listened with a great deal of interest to the gentlemen who have addressed us, especially Mr. Publow, a man whom I have known for some time, being in the dairy business myself. I am operating four cheese factories, and have about 300 patrons. I believe that Mr. Publow has done more for the cheese business in Eastern Ontario than any other one man in the Province. He has the faculty of selecting men for instructors who have ability, and these men go from factory to factory and give instruction as to the best way of making cheese. Now then we come to the question that is before us, and we are told by the Deputy Minister that this has been placed on the Statute Book, and they now come to you for instructions as to whether you think it is a good act or not. Now I think that is beginning at the wrong end. They should have come to you first. Any man can put up a good strong argument in favor of this Act, and it is very hard to put up an argument against it. To be fair and honest one man does not want the other man's money, but we must consider what is going to be the effect of this legislation. In order to operate a cheese factory we must have co-operation. We must have the give-and-take spirit or we cannot succeed. While there is a good deal to be said in favor of this Act, it is just possible that there is something to be said against it. The man who is an in-

dustrious farmer and who takes proper care of his stock, feeds well and sends a good supply of milk to the factory, naturally thinks that he should have better milk than the fellow who allows his cows to stand up against the side of the barn and shiver with the cold; but if we look at the results as given here we find that the man that is letting his cow stand up against the side of the barn and shiver is going to get the best results and the most money for his milk.

MR. HENRY GLENDENNING: No, that is not so.

MR. PAUL: We were told last night that some cows increased from 6,000 to 8,000 pounds of milk in the season, and I asked which cow produced the largest amount of butter fat, and I was told the cow that produced 2,800 pounds of milk. Therefore, the cow that is producing the least milk is giving the highest percentage in butter fat. One of my patrons came in to see me. He is a good farmer; he said: "What do you think of this Dairy Act." I said, "I have not given it sufficient study to form an opinion." I then said, "What do you think?" and he said, "I think it is a good thing. I don't think we have all been getting justice in the paying for the milk by the pooling system." I said, "Why do you think so?" and he said, "Well I have good cows and I feed them well; my pastures are all high land pastures and they are the Durham breed, and we have a neighbour close by, who has the Holstein breed of cows and his pastures are all swamp; why should my milk be pooled with that man's milk?" I said, "I know who you mean." I had the Government test of both these men's cows, and I found that the Holstein cows that ran in the marsh tested 3.6 and his Durham cows tested only 3 per cent. I have the test in my pocket, and I can give you the names of the men. He said to me, "I don't believe your test is right." I said, "You will have to stand by it." He said, "No, I won't stand by it." Now the difficulty will be that you cannot convince men like that that the test is right. We have got to be convinced that the Babcock test is accurate under all conditions. If this Act is going to have the effect of disorganizing the co-operation we have at the present time we are better without it. We can now only make about 75 per cent. of what we did ten years ago. I am not here opposing the Act and I am not here supporting it. I am here representing 300 farmers who are my patrons: they discussed this matter and they were unanimous in opposing it. I am here to oppose it on their behalf.

I think we had better let this matter stand. It is going to cost some money and it is going to take some officials to carry out the Act. If they are going to put on 40 more inspectors, why should they not take the $40,000 or $50,000 that it will cost and give that to the cheese makers and let them do the work? I warn the Government that they will have to consider this matter carefully.

I would like to know the sentiment of this meeting and I therefore propose the following resolution:

Moved by W. F. PAUL, seconded by E. H. SILLS, "That this convention of the Eastern Dairymen's Association held in Napanee on the 5th day of January, 1917, after carefully considering the "Dairy Standards Act," making it compulsory to pay for milk by The Babcock Test and pasteurizing the whey, do not consider it in the interest of the cheese industry for the following reasons:

"1. We have not been convinced that the Babcock test under the varying conditions of the milk reaching the factories could be made satisfactory to all patrons, and is liable to cause grave dissatisfaction and discord among them, which would eventually disorganize the co-operation now existing among patrons of cheese factories which is so necessary and essential to the cheese industry of the Province.

"2. As the putting into operation of this Act must cause considerable expense, and as this is a time for saving and retrenchment on account of the terrible war,

we would ask the Government to repeal this Act as now upon the Statutes, and that a copy of this resolution be forwarded to the Premier and the Minister of Agriculture for the Province."

MR. T. A. THOMPSON: I have given a great deal of thought and attention to the Dairy Standard Act. We are here to-day wishing to better the conditions of the dairy farmer in Eastern Ontario. We are here to listen to any reasonable method that will place the great dairy industry of this country on a higher level. I have never done anything else except farm and milk the dairy cow, and I would be sorry indeed to cast any reflection upon the life work of such men as Mr. Publow, Mr. Barr and Mr. Zufelt, Mr. Dean and other dairy experts of this Province. These men have spent their lifetime in the study of dairy matters. These experts tell us that more cheese can be made from milk that is richer in butter fat than from poor milk; if that is the case then it would be better for the dairy industry to have the Dairy Standard Act carried into force. We must believe these men. I believe them; I believe they are telling us something that they have tried out and tested in every way and something that they are sure about. If that Act were carried into effect to-day it would do away with the pernicious habit of tampering with milk. What have we to-day, I know of what I speak, because these matters come before me as Secretary of this Association. We have between $2,000 and $3,000 collected as fines from people who tamper with their milk. I am satisfied that we are not getting half of them. If we were paying by test there would be no inducement to water the milk, or skim the milk, because he would be paid for what he sent to the factory according to its value. I do not think anybody will say that the man who sends one hundred pounds of milk testing 4 per cent. should not get more for it than the man who sends one hundred pounds of milk testing 3 per cent. The question is whether this is an opportune time to carry this legislation into effect. Let us deal with this question in a reasonable manner. I would be sorry to see this meeting turn down the life work of the dairy experts of this country, and the conclusions which they have honestly arrived at. Therefore, as the meeting was going on I drafted this resolution which I will submit for your approval.

Moved by T. A. THOMPSON, seconded by R. G. LEGGETT: "That this meeting, while not condemning the principle of paying for milk delivered at cheese factories by the butter fat test, or the pasteurization of whey, yet thinks that it is in the best interest of the dairy business to ask the Ontario Government to postpone the date of the administration of the Act, as at the present time it is in advance of public opinion, or until such time as further educational work has been carried on."

A MEMBER: Who has the right to vote on this resolution, members of the Association only?

THE CHAIRMAN: I think every person present who has an interest in dairying should have the right to vote.

A MEMBER: Are these resolutions from the Dairymen's Association or from individuals?

THE CHAIRMAN: These resolutions are put before the meeting by individuals. So far as I know every man in this building has a right to vote.

MR. FREE, Cobourg: We have a great war on our hands, and I have a number of cheese factories on my hands, and if you will devise some way that I can unload them on to somebody else I will support this Act. One of my patrons was going to turn the factory upside down because he was not paid by test. I started paying by test, and to my surprise this man who was making the big kick did not have a

good test, and I have not heard a word from him since. After this Act comes in force you will find there will be a great deal of trouble in that way. Men who think their cows test up high will find they are low, and there will be a lot of trouble. We have a big war on our hands and that is trouble enough for the present.

A MEMBER: Some people are under the impression that if this Act comes into operation the Holstein cow will go out of use in this Province. I think that is a great mistake, because the Holstein will give a good test and a large amount of milk.

MR. FREE: I tested a Holstein that gave 5 per cent. milk. The Holstein is a good cow and gives large quantity of milk. I am bound to say that I think putting this Act into operation at this time is a mistake.

MR. THOMPSON: Mr. Ayer made some remarks which might lead you to suppose that I opposed the Dairy Act. I bored the cheese that he exhibited to you to-day, and the remark was made at the time. This first prize cheese scored 97, and it was made out of 3.2 per cent. milk. He asked me to bore a cheese made from 4.2 per cent. milk, and I did so and it bore out the argument made by Mr. Ayer to-day.

MR. PAUL: I believe this amendment is going to accomplish what is wanted by the people, and with the consent of my seconder I will withdraw my motion. (Original motion withdrawn.)

MR. W. R. LOTT, Napanee: I do not think the feeling of all sections of the community on this question has been voiced. I do not think there is any desire on the part of the experts to put upon the country any particular breed of cattle. I think the whole desire is to have an equitable principle for paying for milk. Some people have the idea that there is going to be unfairness. I am sorry that the experts have not given us some data as to what the Act will cost to administer. I think the Act should be given a fair trial.

A MEMBER: I notice that you use the word "postpone" in that resolution. Why not say "postpone for one year?"

MR. T. A. THOMPSON: My idea in drafting this resolution was to put off the carrying into effect of the Act until such time as the dairymen asked for it. Yet we are not condemning the principle for which our experts have been fighting.

The resolution moved by Mr. T. A. Thompson was then put to the meeting and carried.

ADDRESS.

DR. JAMES W. ROBERTSON, OTTAWA.

I do not propose to make a dairy speech this morning. I enjoyed listening to the discussion of the last session. I put my hand across my brow on two or three occasions to see whether I had not been asleep for twenty years, and had not just awakened up in the middle of the same discussion.

The farmers of our Allies, in the devastated regions of which I spoke last night, have lost everything in the war. In some cases the land itself is torn beyond any possible recovery into use for growing crops. The whole British Empire wants to help these farmers to get on their feet as soon as they get back into possession of their farms. Their houses and machinery have been destroyed. They have nothing with which to begin farming again. We on the other hand have lost

nothing as farmers through the war; but in some cases have made a great deal of money because of the increase in prices. We ought to help our stricken brethren as soon as the enemy is pushed out of their countries. We want to do that for several reasons. The object is humane and we are a humane people. They are our Allies, our neighbors and our friends; and we want to help them for the sake of the good name of Canada. It would be a good thing for our foreign trade to have our agricultural machinery, furniture and household utensils known in these lands; and it would be a good thing in our international trade and other relations to have it known that the dairymen of Canada gave something, a good thing to have it known that our grain growers gave something, a good thing to have it known that our live stock men gave something, and that our poultrymen and fruit growers have given something. We want a place for Canada a place among the nations, on behalf of our farmers, which will be in keeping with what our sons and brothers have done and won on the fields of battle.

For all these reasons may I suggest that you think kindly of having at least one day's milk set aside for these farmers who have suffered. You will never miss it. It will be laid up "where neither moth nor rust doth corrupt and where thieves do not break through and steal." It will be to our everlasting credit. Under these circumstances I beg to read the following resolution:

Moved by J. N. STONE, seconded by G. G. PUBLOW, and resolved, "That the Dairymen's Association of Eastern Ontario, in annual convention assembled, records its deep sympathy with the farmers in the countries of the Allies, who have suffered the destruction of property through the invasion of their countries by the enemy forces, and recommends to all dairymen that they should contribute the value of at least one day's milk to the Imperial Agricultural Relief of the Allies Committee, to aid the farmers in the devastated regions to obtain seeds, machinery, live stock, furniture, utensils, clothing, etc., whereby they may be assisted to go on with their work as farmers as soon as the enemy has gone."

Carried unanimously by a standing vote.

THE USE OF PEPSIN AND OTHER SUBSTITUTES FOR RENNET IN CHEESEMAKING.

GEO. H. BARR, CHIEF, DAIRY DIVISION, OTTAWA.

Early in the season of 1916 it became apparent that there would be a scarcity of rennet extract in the Provinces of Ontario and Quebec. Members of the Dairy Commissioner's staff immediately commenced experimenting with substitutes at the Finch Dairy Station. Several lots of cheese were made by adding to the milk a 10 per cent. solution of hydrochloric acid at the rate of 5½ ounces per 1,000 pounds of milk, and using only half the usual quantity of rennet extract. Fairly good cheese were made in this way; the texture, body and color being about equal to those made from the same lot of milk in which the full quantity of rennet extract was used. The flavor, however, was much inferior on account of the strong hydrochloric taint, which was still quite pronounced when the cheese were seven months old.

Pepsin was used with better results. It is well known that pepsin is used quite extensively for medicinal purposes, and has been used in a very limited way for making cheese.

Between the 23rd of May and the 2nd of June, five lots of cheese were made with pepsin and rennet extract. The milk was divided into two small vats, and pepsin at the rate of 2 drachms per 1,000 pounds of milk was used in one, and in the other, Hansen's Rennet Extract at the rate of 3 ounces per 1,000 pounds of milk. The curds were handled as nearly alike as possible.

On June 7th the following dairy experts were invited to visit Finch and examine these cheese:

Geo. A. Putnam, Toronto; Prof. H. H. Dean, O.A.C., Guelph; Frank Herns, London; G. G. Publow, Kingston; L. A. Zufelt, Kingston; E. Bourbeau, St. Hyacinthe, Que.; and Mr. Geo. Hodge, as representative of the Merchants' Produce Association, Montreal, Que. The Dairy Commissioner, Ottawa, and several members of the staff were also present.

It was the opinion of all those present that from a commercial standpoint there was no difference in the quality of the cheese made with rennet extract and those made with pepsin.

These cheese were kept in the cool curing-room at Finch all summer and were examined by the writer about every six weeks. On August 22nd they were examined by John L. Sammis, Professor of Dairy Husbandry, College of Agriculture, Madison, Wisconsin. His judgment was that there was practically no difference in the quality of the two lots.

In no case has the flavor of the pepsin cheese been inferior to that of the rennet cheese. My judgment is that at the present time the pepsin cheese are equally as good in texture and slightly better in flavor than those made with rennet extract. Some of these cheese can be seen at the dairy exhibit at this convention, and every one interested should examine them.

So convinced were we that pepsin was a safe substitute for rennet that from the 1st of July until the end of the season, not an ounce of rennet was used at the Finch Dairy Station except in an experimental way. Armour's Soluble Powdered Pepsin was used and the quality of the cheese during the season was such that a premium of from 1/16 to ¼ of a cent was received. Cheese from every month have been sold locally and we have yet to see or hear of anything being wrong with the texture.

I think I am, therefore, justified in making the statement that as good cheese can be made with pepsin as with rennet extract. I have not heard any one make the statement myself, but have heard rumors that some people are claiming that cheese made with pepsin would not keep their flavor, and also that the texture would go wrong as the cheese ripened. So far as our experience goes, there is no truth in such a statement. If there are such defects in cheese made with pepsin, they are due to the condition of the milk or wrong methods of making, and not to the use of pepsin.

The situation, so far as the Dairy Division was concerned, developed into a question of what kind of pepsin rather than the use of pepsin. It was surprising how quickly the pepsin business developed. During the season we found nine different brands being offered for sale, and, in addition to these, six different brands of liquid coagulants, making fifteen different brands of coagulants on the market. Probably there are more than this number at the present time.

I must say that all the samples of pepsin received gave good results when the proper quantities were used. There was a very wide variation in the strength of the different brands of pepsin and the tables which follow show the brands we are able to make reliable reports on.

I regret we cannot report very favorably on the rennet extracts made in Canada during the past season. Some of the samples received were bad in flavor and unreliable as to curdling properties.

We have some cheese on hand made with rennet extract made in Canada which have gone wrong in flavor, while those made with Hansen's Rennet Extract from the same lot of milk are still good in flavor.

Late in the season we received samples of the following liquid coagulants:

Neco Malt, a solution made by the National Enzyme Co., Inc., Clifton, New Jersey, U.S.A. We got very poor results from it. The firm, however, have forwarded another sample which has not yet been tried.

Hansen's R-P Extract made by Chr. Hansen's Laboratory, Little Falls, N.Y., said to be a solution of 50 per cent. rennet extract and 50 per cent. pepsin. It gave first-class results.

Curdalac, a peptic solution, manufactured by Parke, Davis & Co., Walkerville, Ont., gave equally as good results in every way as rennet extract, R-P Extract, or any of the brands of pepsin with which we were able to compare it.

Cheese made with Curdalac are at the dairy exhibit at this Convention for inspection.

The following table shows the value of a pound or a gallon of different coagulants and the pounds of milk 1 pound or 1 gallon will coagulate fit for cutting in 27.5 minutes:

CHEESE MADE IN OCTOBER AND NOVEMBER.

Coagulant and Manufacturer or Agent.	Value of a lb. or gal.	Lbs. Milk.
	$ c.	
Soluble Powdered Pepsin—		
Armour & Co., Chicago, Ill	4 10	37,864
Renzyme—		
T. E. O'Reilly, Ltd., Toronto, Ont	8 54	83,333
Granulated Pepsin—		
American Pepsin Co., Madison, Wis	7 93	73,242
Scale Pepsin—		
Frederick Stearns & Co., Windsor, Ont	6 22	57,515
Scale Pepsin—		
The Bennett & Messecar Co., Ltd., Mille Roches, Ont	5 19	47,996
Granulated Pepsin—		
National Drug & Chemical Co., Montreal	3 41	31,497
Spongy Pepsin—		
Parke, Davis & Co., Walkerville, Ont	2 72	25,142
Rennet Extract—		
Chr. Hansen's Laboratory Inc., Little Falls, N.Y	3 97	36,666
R-P. Extract—		
Chr. Hansen's Laboratory Inc., Little Falls, N.Y	3 72	34,378
Curdalac—		
Parke, Davis & Co., Walkerville, Ont	3 97	36,666

These figures show the state of the pepsin trade at the present time. Too many kinds and too much difference in strength would be my judgment. As to the liquid coagulants, you will note there is very little difference in their strength and value so far as their coagulating properties are concerned. Their action during the process of manufacturing the cheese is practically the same, and I think you will find little if any difference in the quality of the cheese.

The loss of fat in the whey is an important point in manufacturing cheese, and we must admit that we found a greater loss from the use of pepsin than from

rennet extract. Up to the present time, I am unable to account for this condition, as the pepsin coagulation is apparently as perfect and the curd shrinks as well during cooking.

The following figures show the relative loss of fat in the whey from cheese made in October and November. Some of these cheese were made from milk delivered every other day, and the loss may possibly be greater on that account than if the work had been done earlier. We could not get the work done any sooner, as the R-P Extract and Curdalac were not received until October.

Coagulant.	No. of Curds.	Average Loss.
Pepsin	15	.314%
Hansen's Extract	4	.245%
Hansen's R-P	3	.286%
Curdalac	5	.318%

In making cheese with pepsin, there are a few points which should be noted. There is a great variation in the strength of the different brands and care must be taken in testing the strength. The rennet test will not give a true indication of the curdling strength of a pepsin solution if compared with rennet extract. For instance, 1 c.c. of rennet extract in 6 ounces of milk curdled it in 40 seconds, while the same quantities of milk and pepsin solution curdled in 16 seconds, but when two vats of milk were set with the same quantity of each solution, the curds were ready to cut in the same time. The rennet test is, however, a safe guide as to the relative strength of different pepsin solutions. Preparing the pepsin for use is somewhat inconvenient. The practice followed at the Finch Dairy Station was to prepare the solution the previous evening by dissolving the required quantity of pepsin for the following day at the rate of 2 drachms of pepsin to 3 ounces of water and then using the required ounces per 1,000 pounds of milk. This is a good safe practice during the summer months. Many makers have made a practice of dissolving 1 pound of pepsin in 10 pounds of water and adding salt as a preservative. If this is done, distilled water should be used, and the solution kept in a cool place. Personally, I think it safer to make up the solution daily.

Curds made with pepsin should be salted about ⅛ of a pound less than if rennet extract were used (all other conditions being equal). Enough pepsin must be used to coagulate the curd ready to cut in about 25 minutes. The longer the time between setting and cutting, the greater the loss.

It may be interesting to know to what extent pepsin was used for making cheese in 1916. I wrote all the dairy instructors in Ontario and Quebec asking them to report the number of factories using pepsin, pepsin and rennet combined, and rennet extract; also the prices paid. The following is a summary of their reports:

Province.	No. of Factories using				Prices paid for			
					Pepsin		Rennet.	
	Pepsin.	Pepsin and Rennet.	Rennet.	Total.	Highest.	Lowest.	Highest.	Lowest.
					$ c.	$ c.	$ c.	$ c.
Quebec	244	142	620	1,006	4 85	3 05	16 00	3 50
E. Ontario	158	295	401	854	7 25	3 00	15 00	3 10
W. Ontario	.....	3	145	148	5 00	3 25	10 00	4 00
Total	402	440	1,166	2,008	.....	.....	.....	.....

So far as I know at present, there was practically no pepsin used in any of the other provinces. The above figures show that nearly 42 per cent. of the factories in Ontario and Quebec used pepsin to some extent in 1916. We have not yet heard any unfavorable reports from the Old Country as to the quality of the cheese. I, therefore, think we are perfectly safe in assuming that the cheese industry is in no danger of being injured by a shortage of rennet extract.

THE CANADIAN DAIRY SITUATION

J. A. Ruddick, Dairy Commissioner, Ottawa.

I am glad to again meet the Dairymen's Association of Eastern Ontario. I have been attending these conventions regularly for about thirty-five years, and I feel that I am one of the older members. So many of those who were prominent in the Association when I first attended have gone away from us.

The Use of Pepsin in Cheesemaking.

Last year, through pressure of special work in which I was engaged for the British War Office, I was unable to be with you. I was bound to come this year, because I did not want to lose touch with the practical cheesemakers and dairy farmers in this district of Eastern Ontario, and especially in this district of Napanee. The mention of Napanee always calls to my mind the fine cheese we got from this district at the time of the World's Fair at Chicago.

I want to say a word or two on what has been said so admirably by Mr. Barr. When the situation developed last spring showing that there was going to be a shortage of rennet, three things were considered, first, to get some substitute that would give satisfactory results and not injure the reputation of our cheese. I had correspondence with the representative of the New Zealand cheese-making industry in London, and he told me he had been informed by a very prominent cheese exporter who handles Canadian cheese that cheese made from pepsin would not keep. This gentleman happened to be one of my oldest friends in the business, and I at once wrote to him and told him that I had heard of his statement and wanted to know what his opinion was, because I said we were very deeply concerned over this question. I found that he had not any foundation behind his remarks, he was just afraid the cheese would not keep.

This scarcity of rennet developed and we had no information as to what lines of pepsin would be available, and it seemed a wise thing to lay in a supply and on my recommendation the Minister of Agriculture authorized the Department to purchase a considerable quantity. We had to do the thing hurriedly, and we got an option on a ton of it in Chicago. It just so happens that at the time I asked for this option, a merchant in Montreal telegraphed Armour's and wanted to know what they would take for a car load of pepsin. That would be nearly sufficient to make all the cheese in Canada for a year. These people evidently thought there was a great demand for pepsin in Canada, and they put up the price, and I paid rather more than I should have paid, the actual cost laid down in Ottawa being $4.10 per pound. That action on the part of the Department rather steadied the situation; it restored confidence in the minds of the cheesemakers, as they knew that they would be able to get supplies in case of need, and I think it also had the effect of regulating the price to some extent, and probably it will continue to do that because we have a supply on hand which we are not trying to sell. I do not think you could buy rennet extract for less than $12 or $15 per gallon, and I was offered ten thousand gallons at $10 per gallon, but it would cost $5 per gallon to lay it down in Canada. Calves' stomachs that were selling for 5c. before the war are now selling for 25c. The large supply came from Russia, and they have prohibited the killing of calves. And large supplies were obtained from Hungary and Germany, so that you see the supply, except from Holland and Denmark and Sweden, is almost entirely cut off. It is not a question now of whether we will use pepsin or not, it is a question of using the right kind; because we will have to use pepsin; there doesn't seem to be anything else. You must remember it is not a new thing; it has been known for many years. Heretofore the cost of pepsin has been double the cost of rennet, under war conditions we find that pepsin is the cheaper. There is no reason in the world why we should not use it.

I think it is worth while that we have been able to establish confidence in the cheesemaker as to how it should be used.

There are one or two aspects of the dairy situation that I would like to draw your attention to very briefly:

THE EXPORT TRADE IN DAIRY PRODUCE.

It is well known that the export of dairy products from Canada reached a high point in 1903, in which year the total value was $31,607,561, only to recede again until in 1914 the total exports amounted to only $21,193,168. Once more it is on the increase and in the year ended March 31st, 1916, the total exports were $29,673,977. This increase is due partly to an increase in the quantity exported and partly to higher prices. The past season, the year for which will end March 31st, 1917, will show a still further increase in quantity as well as in value. The total value of the exports of all dairy products for the current year will probably be over $40,000,000, the highest on record. The details of the exports for the year ending March 31st, 1916, which are the last complete figures available, are as follows:—

Exports of dairy produce for the year ended March 31st, 1916:—

	Lbs.	Value.
		$
Cheese	168,961,583	26,690,500
Butter	3,411,183	1,018,769
Condensed Milk	13,247,834	770,566
Fresh Milk, gallons	1,262,280	59,028
Cream "	394,831	1,131,832
Casein, lbs	50,564	3,282
		$29,673,977

As already stated there has been a further increase in the exports of butter, cheese and condensed milk for the season of 1916. The quantity of cheese available for export during the current year will be about 182,000,000 pounds, or 45,000,000 pounds more than we exported in 1914, in which year the exports of cheese were the smallest since 1903. If we make as much progress in the next three years we will exceed all previous records in quantity as well as in value. I am not, however, making any forecast on this point. I am reminded of the prophecy made by a leading cheese exporter a few years ago, when he said that in four years from that time we would have no cheese at all to export.

The revival of our exports of butter with a decrease in the quantity imported is a very gratifying turn in the trade. Our record export of butter was 34,128,944 pounds in 1903. After that year the exports of butter fell to 828,323 pounds in 1913, in which year we imported 7,989,269 pounds. Once more the trend is upward and for the year ended March 31, 1916, the exports were 3,411,183 pounds, while for the current year there will be about 10,000,000 pounds exported and less than 1,000,000 pounds imported.

If we add the reduction in the imports to the quantity exported, it shows an increase of 16,000,000 pounds in three years.

THE OUTLOOK FOR CANADIAN DAIRYING.

I am not rash enough to pose as a prophet with respect to developments that may take place in connection with the dairying industry during the next few years. There is one thing, however, which seems reasonably certain, and it is this, that as long as the war continues the prices for butter and cheese will be high. For another thing, it is not unreasonable to suppose that the millions of soldiers having become accustomed to cheese as an article of diet will continue to use it after the war is over, and that will make for continued demand. It is well to remember that the present high price of cheese is not due to a temporary shortage as in the case of butter, but because the demand is unusual and greater than the supply.

There is undoubtedly a great falling off in the number of live stock in some of the European countries and if the current reports in regard to the matter should prove to be correct, there is bound to be a scarcity of dairy produce for some time after the war is over. I hope to have some accurate figures on this point for the convention at Woodstock next week.

The scarcity of ocean transport will probably affect the situation for some time to come, especially in regard to supplies from New Zealand and Australia. At the present moment stocks of butter and cheese are accumulating in New Zealand to an unprecedented extent owing to lack of shipping facilities. The available storage space is all rapidly being filled, and the trade is very much alarmed at the situation which is developing.

We are rather more favorably situated as regards ocean transport and will probably not be inconvenienced to the same extent as our cousins in the Antipodes.

On the whole, it seems to me that the outlook for the Canadian dairy industry is encouraging and there seems to be every reason to warrant a large increase in production in the next few years.

DAIRY PRODUCTION IN CANADA.

Actual statistics of dairy production since the last census in 1911 are rather fragmentary, but the information which is available is not without interest.

The Ontario Bureau of Industries report a further increase in the output of creamery butter and cheese in 1915, the output of cheese being 23,000,000 pounds over that of 1914. The figures for 1916 have not yet been published, but the exports show that the increase has been continued.

Incidentally it may be noted that the number of milch cows in the Province shows an increase of over 15,000 in 1915 as compared with the previous year.

Nova Scotia is making progress in dairying, the production of creamery butter having been quadrupled in the last four years.

But the most significant development, and the one which holds out the greatest promise for the future, is in the four Western Provinces, and particularly in the Prairie Provinces. In 1912, these Western Provinces consumed between 16,000,000 and 17,000,000 pounds of butter from outside sources, in addition to what they produced themselves. They now have a surplus after supplying all their own needs. The following table illustrates this development:—

CREAMERY BUTTER PRODUCTION IN THE WESTERN PROVINCES.

—	1900	1907	1910	1915
	Lbs.	Lbs.	Lbs.	Lbs.
Manitoba	1,557,010	1,561,398	2,050,487	5.839,000
Saskatchewan	339,014	132,803	1,548,696	3,811,014
Alberta	407,970	1,507,697	2,149,121	7,376,871
British Columbia	395,808	1,283,797	1,206,202	1,300,000
Totals	2,699,802	4,485,695	6,954,506	18,326,885

The production of *dairy* or home-made butter in these four provinces increased from 13,305,873 pounds in 1900 to 31,949,072 pounds in 1910. Later figures for this product are not available, but the increase is known to be large.

The total value of all dairy products in 1900 and 1910, as revealed by the census, with an estimate for 1915 is as follows:—

	1900	1910	1915
	$	$	$
Manitoba	2,792,606	6,077,982	*9,000,000
Saskatchewan	729,574	7,566,007	*11,500,000
Alberta	546,476	7,855,751	*12,500,000
British Columbia	1,159,993	2,620,495	3,432,000
	5,228,649	24,120,235	36,432,000

The values for 1916 will be much higher, partly because there has been a further increase in production, but chiefly because prices have been so abnormal. For that reason a comparison of values including 1916 would be misleading. The estimates for 1915 are based on average prices.

It is quite within the possibilities that inside of five or six years Canada may be exporting as large a quantity of butter as in the record year of 1903, when the total reached 34,128,944 pounds.

The present is, therefore, a critical period in the development of the Canadian creamery industry, and every effort should be put forth to protect its good name. The creamery industry in the Prairie Provinces is being directed along progressive lines, and the system of educational grading which is being so successfully worked out is bound to have an important influence on the quality of the product.

War conditions are having a very stimulating effect on the condensed milk industry, and a considerable quantity of milk is being diverted from cheese factories to the condensories in Western Ontario.

We can only estimate the total value of all dairy production in Canada in 1916, but it must be between $180,000,000 and $200,000,000.

I do not want to put too much emphasis on these totals. They are very attractive and interesting as showing the importance of the dairying industry, but after all it is the position of the individual dairy farmer which deserves attention. It is the yield of milk per cow or per acre which determines the real value of the industry. It would be quite possible to produce this quantity or even a much larger quantity without the individual farmer making a satisfactory profit.

If you ask the average consumer these days you will find that he is convinced that the milk producers are making more than a fair share of profit. When I am approached on this point by any of my city friends I always say to them that until they are prepared to get up early in the morning—every day in the year—to milk cows, and do the other necessary work connected with milk production, they are neither entitled to criticize nor competent to do so.

Whether dairying pays the individual or not it can be asserted without fear of successful contradiction, that those districts where the production of milk has been most consistently and extensively followed are the most prosperous, and if it paid in the past, it must surely do so in the future with the great improvement which is being made in the herds by following intelligent methods, breeding and selection. The increase in milk production during the last ten years which is to be credited to this factor is equivalent to the average yield of 250,000 cows. This

* Estimated.

fact is sometimes lost sight of by those who judge of our progress in dairying by the number of cows kept.

The testing of individual cows as shown by the records in the Dairy Division at Ottawa is becoming more popular every day, and the propaganda which has been carried on for the last ten years is showing results. Concern has been expressed in some quarters at the decrease in the number of cows in this Province as indicating a decline in the industry. I do not look upon the situation in that light. On the contrary, it shows a healthy condition when we can produce more with a smaller number of cows. A further increase of 25 per cent. is quite possible without adding a single cow to the existing number and that would mean an additional return of $10,000,000 to $15,000,000 in Ontario alone.

Prices for Butter and Cheese.

Butter.

The price of butter and cheese is not regulated by local conditions as some people seem to think. With improved transportation and better commercial organizations, the marketing of butter and cheese has developed an international character and prices find a relatively uniform level in all dairy countries. The quantity of these articles produced in Canada or the quantity in store at any time has very little effect on the prices in this country, except in so far as these quantities affect the world's supply.

The United Kingdom is the world's great market for dairy produce, more being imported by that country than by all the other countries of the world combined. If we look at the imports for the last three years, the cause of the present high prices of butter and cheese is at once disclosed.

Quantities of Butter Imported into Great Britain for 11 Months Ended 30th November, 1914-1915-1916.

From—	1914	1915	1916
	Cwt.	Cwt.	Cwt.
Russia	596,910	979,743	34,542
Sweden	255,747	128,608	992
Denmark	1,623,295	1,238,764	1,051,570
Netherlands	179,900	44,567	29,842
France	243,952	332,361	124,697
United States of America	7,562	75,029	124,155
Argentine Republic	40,448	69,203	110,247
Victoria	168,371	80,189	59,724
New South Wales	97,725	154,481	26,682
Queensland	103,266	107,424	25,354
New Zealand	305,708	291,033	291,769
Canada	3,149	24,001	97,661
Other Countries	30,905	51,990	14,425
Total	3,656,938	3,577,393	1,991,660

These figures show that there has been a decrease of over 45 per cent. in the total imports of butter into the United Kingdom since the war began. Russia, the second largest source of supply in pre-war days, is now prevented by the exigencies of the war from sending but a comparatively small quantity, less than six per cent. in 1916 of the quantity supplied in 1914. Sweden is apparently

finding another market for practically the whole of her output and one does not require much imagination to decide where it is going. Denmark, the largest source of supply, is also selling to Germany about one-third of the quantity formerly disposed of in the United Kingdom. The thrifty Dutch are likewise disposing of the bulk of their surplus. In addition to the diminished supplies from these countries, there is a shortage of 257,602 cwts. in shipments from Australia, due to unfavorable conditions for production. Canada, United States and the Argentine Republic are the only countries which have increased their exports during this period. The largest percentage increase is from Canada, but a slightly larger absolute increase must be credited to the United States.

Cheese.

In the case of cheese there has also been a large decrease in the imports from Holland and Italy, but these decreases are more than offset by the large increases from Canada and the United States. On the whole, there is an increase in 1916 as compared with 1914, as the following figures indicate:—

IMPORTS OF CHEESE INTO UNITED KINGDOM FOR 11 MONTHS ENDING NOVEMBER, 1914, 1915 AND 1916.

From—	1914	1915	1916
	Cwt.	Cwt.	Cwt.
Netherlands	317,717	128,607	75,101
Italy	86,860	73,213	31,916
United States of America	24,039	452,673	266,627
Australia	18,155	20,948	1
New Zealand	674,761	640,358	660,453
Canada	1,068,370	1,194,505	1,372,170
Other Countries	25,655	15,825	11,588
Total	2,215,557	2,526,129	2,417,856

While the diminished supplies of butter have been responsible for the higher prices, the high prices of cheese is the result of the greatly increased demand owing to the fact that cheese has been adopted as a ration for the army. It is the law of supply and demand working in both cases.

MR. MACK ROBERTSON, Belleville: I am not not going to take up much of your time. I feel that some creamery men should apologize to the Dairymen's Association for the showing of butter which we have here at this exhibition. If you have not looked closely you have perhaps not seen it. My object in getting up is simply to point out to the Dairymen's Association that I, as a creamery man, do not think the creamery interest is getting the same attention that our great sister industry is getting. I believe it is up to the creamery men to bring it more to the front.

What I want to point out to the directors is that the prize list is not properly made out; we have not secured our proper share of the prizes, and I believe that if more prizes were given for butter exhibits that we would have a better showing. In some cases the exhibitor of butter at this exhibition was in the same class as the man who showed a cow at a fall fair and took the first prize because it was the only cow there. I would like to run over the prize list and draw your attention to some sections of it.

Take the first item on the list, $50 in value given by the Windsor Salt Co. $30 goes to the cheese industry and about $20 to the dairy. I do not think that is fair to the creamery business. The fact that we are small is a good reason for helping us all the more.

Then the next item, "By the Instructors and Cheese Makers." There are two cups to be presented to the winners, but there will be no creamery men on the platform. I do not think you are helping the creamery industry as it should be helped.

Then the next item on the prize list is $25, given by the Verrett, Stewart & Co. It all goes to the cheese industry. I do not think that is fair.

Then we come to the Western Salt Co., Courtright. I find it is equally distributed between cheese and butter, and we have no complaint, and we will have enough salt to salt ourselves down.

Then our reporter, Mr. W. C. Coo, has given a prize to the ladies. We knew that if Mr. Coo gave any prize he would give it to the ladies for making butter, and he was quite justified in doing it, and I compliment him on the beautiful gold wrist watch he donated.

Then we have the De Laval Dairy Supply Co. prizes, and they are equally distributed, and I congratulate the Board on doing that.

Then there are four prizes given by the J. B. Ford Company, but none of them come to the creamery business. The rest of the prizes I find are more equally distributed.

I am not bringing this before the Association in any fault finding mood. I believe the creamery men are to blame. I feel that the directors of this Association are big, broad-minded men, who are willing to help and to do what is right by all branches of the great dairy industry. If these things are not brought to their attention, it is the fault of the creamery men and I thought it was my duty to bring these matters to your attention.

I realize that this is a cheese section, but you must realize that the creamery industry is growing. If I can help along in any way towards prizes I will be very glad to do it.

MR. REDDICK: I cannot help but endorse Mr. Robertson's statement in every way. When we consider the place Ontario butter has taken at the exhibitions the last year, it makes us feel that the creamery business has been neglected. At nearly all our exhibitions, the Western Provinces and Quebec have carried off nearly all the prizes. Creameries in these provinces have been recognized to a larger extent than they have been in Ontario. The Department is considering legislation with regard to the grading of cream and butter so as to raise our standard of quality, and I believe it is the proper thing to do. Personally I feel as Mr. Robertson does that we should be encouraged. We are perfectly willing to contribute our part.

MR. NEWMAN: When I look at the sample of butter exhibited by the creamery men of Eastern Ontario and compare it with the cheese exhibit, personally I wish to apologize. I have not an exhibit of butter here to-day. When I received your folder speaking about the prizes, I said, "Yes, we will exhibit," and I laid it on my desk, but it was overlooked and I am to blame. Why is it that you have so fine an exhibit of cheese? It is because every one of the instructors went after each one of the cheesemakers and got them to exhibit their cheese. That is the reason. Why is it that we have not got a good big exhibit of butter? I am not casting any reflection on Mr. Zufelt, none whatever, but let me show you what

he is. He is the Superintendent of the Kingston Dairy School. He is instructor over all the creameries in Eastern Ontario, and again he is demonstrator of the Dairy Standards Act. I believe he attended more meetings at cheese factories last year than he did creameries. I think Mr. Robertson was wrong when he said we made $4,000,000 worth of butter, it should have been 4,000,000 pounds of butter. We have made a good supply of butter, and it has shown an increase of 30 per cent. in the last year. We are making butter right now, we make it right along in the winter time, and the Department of Agriculture do not ask me one single question as to how I am getting along nor do they give me any help of any kind.

We had a great discussion this forenoon on the Dairy Standards Act and I am sorry for the way it went. I think it was the district of Napanee that threw it out; I do not think it was the voice of Eastern Ontario. It is done as far as you are concerned, and I do not think there is any use discussing it any further. There is a clause in that Act with reference to the grading of cream that is of great importance. Up to a year or so ago our market has been Western Canada. We made our butter as best we could, but good, bad or indifferent they took it out there and paid us a pretty good price for it. Then the Western Provinces began to make some advancement, and I had some work to do with them, and I have watched it with a good deal of interest, especially in the Province of Saskatchewan. These provinces do not want our butter. Not only that, but they are able to supply British Columbia, and export to Great Britain.

The point I want to make is this: We would have been selling butter at a much lower price to-day if it had not been that Europe met with an accident. Europe went to war, and to-day we are getting enormous prices. Blood money, that is what it is, and we have not made any improvement. We hope that the war will soon be over and that the price we receive for our butter will not be increased by the blood of our young men, but because of the laws of regular supply and demand. If we get the grading of cream we will make better butter than we have ever made before. And when the war is over we will be able to hold that English market; if we do not hold the English market we will have to sell our butter at a very low price. Will Mr. Zufelt give us one instructor who will go into as many creameries as will consent to grade their cream, if you do not wish to make everybody do it? Mr. Zufelt has not got the time to come and stay with us, and I think we have reached the time in Eastern Ontario when we should have one other instructor who will give us his whole time and attention and work especially towards the grading of cream, and we should work in conjunction with Western Ontario. If that is done I think we will show better results in one year in quality than you have ever been able to show in any one year in connection with cheese. This will be a splendid step in advance, and the dairymen of this section will receive something that will be of benefit to them, and I feel sure that next year we will fill a hall as big as this with butter.

REPORT OF RESOLUTIONS COMMITTEE.

MR. J. A. SANDERSON: We have pleasure in submitting the following resolutions:—

We, the members of this Association, desire to express our appreciation of the kindness of the Mayor of Napanee and the Town Council in furnishing the free use of the Armouries, and for the willingness with which they assisted in

carrying out all the details in connection with the convention. We also wish to thank the citizens of Napanee for the kind and hearty reception given to us and especially are our thanks due to Mr. G. B. Curran, B.S.A., District Representative for the Counties of Lennox and Addington, for the valuable assistance he has rendered in making this convention a success.

We wish to tender our sincere thanks to the various speakers whose excellent addresses have made this one of the most important conventions in the history of the Association.

The thanks of the Association are hereby tendered to the Canadian Salt Co., of Windsor, through their general manager, Mr. E. G. Henderson, for the very handsome and appropriate badges presented to the Association.

The thanks of the Association are hereby tendered to the Press for their excellent reports of this convention.

The thanks of the Association are tendered to The Canadian Salt Co., The Instructors and Cheese Makers, Verret, Stewart & Co., The Western Salt Co., Courtright, William C. Coo, Toronto, The De Laval Co., Peterborough, The J. B. Ford Co., Wyandotte, Mich., C. Richardson & Co., St. Mary's, and W. A. Drummond & Co., Toronto, for the splendid special prizes which they offered to the exhibitors at this Dairy Exhibit.

We wish to express our sincere sorrow for the great loss this Association has sustained through the death of the Honorable Jas. S. Duff, late Minister of Agriculture, Dr. C. C. James, Commissioner of Agriculture, Hon. Senator Derbyshire, and Mr. T. G. Wright, and we tender our heartfelt sympathies to the members of their families.

We wish to express our sincere appreciation of the Ontario Department of Agriculture for the assistance rendered the dairy industry during the past year.

Whereas the prohibition of the manufacture and importation and sale of Oleomargarine in Canada is due to the fact of keeping the butter free from abuse which has characterized all Oleomargarine trade wherever that has been used. And our dairy products have enjoyed a high place in the British market largely from the fact that this is known, that they were manufactured from pure milk. A persistent effort has been made by the big interests that would benefit by the establishment of the Oleomargarine trade in Canada to have the restrictions removed: Therefore be it resolved that we the members of the Dairymen's Association of Eastern Ontario in convention assembled do emphatically protest against the removal of the restrictions as they now stand against the importation and manufacture or sale of Oleomargarine in order to preserve the high reputation of our Canadian butter.

Moved by MR. J. A. STONE, and seconded by MR. R. G. LEGGETT, that the report of the Resolutions Committee be received and adopted. Carried.

J. R. DARGAVEL, M.L.A. (in the Chair): The first duty I have to perform is a very pleasant one indeed, the presentation of these beautiful trophies. Mr. Tobin, of Martintown, has won the cheesemakers' trophy. It is not the first prize that Mr. Tobin has won by any means, but this is the first trophy of this kind that the Association has had to present, and I congratulate the Association on the beautiful prizes they have been able to give this year. This silver shield is valued at $125, and it is a great credit to Mr. Tobin to be able to win it. He won it in competition with some of the best cheesemakers in Eastern Ontario, and I can assure you that the reputation of the cheesemakers of Eastern Ontario is second to none in the world. That is a strong statement, but it is perfectly

correct that in Eastern Ontario we have the best cheesemakers in the world. The prices we obtain in Ontario for our cheese compare with the prices obtained in New York State. In some cases we have been receiving 3c. per pound more than they have received. A great many people ask, "What is the Eastern Dairymen's Association doing?" This Association was formed about 40 years ago to promote the interest of dairymen, and anyone who has kept in touch with it all these years will know this Association has done something not only to improve the quality of the cheese manufactured in this part of the Province, but has also done a great deal for the dairymen of Eastern Ontario, in the producing of better stock and in the proper care of the milk and in a great many other ways. The price we are obtaining for our cheese to-day is the best proof of what has been accomplished by the Association. Thirty years ago the difference between the price of a pound of cheese manufactured in Canada and the price of a pound of cheese manufactured in England was from one penny to three pence per pound. In England products of all countries are sold on their merits, and each product has its reputation according to its value and demand. To-day there is practically no difference in the price of Canadian and English cheese; in fact, the large proportion of our cheese is sold in England as English cheese. That is something that we should look into. Our cheese is so good that they cannot be distinguished from the best English cheese. The difference of a penny a pound on our cheese would run into millions of dollars, and is it not something to be proud of that we have been able through the efforts put forth by this Association to bring our product up to the high level of the best English cheese? We hope to continue the good work and make our product still more in demand and of a better quality so that it will be known the world over as the best cheese that can be procured.

Another matter in which we have been able to make improvement is in the amount of milk produced per cow in this country. The average increase per cow in ten years has been about 500 pounds; that is the increase we were able to make in years gone by, but during the past ten years I am informed that the average increase has amounted to 2,500 pounds. That is something to the credit of the Dairymen's Association.

Mr. Dargavel then presented the trophies.

Mr. J. Buro: I assure you I accept this trophy in the spirit in which it is given. I realize that these prizes are not won by chance or in any haphazard way. Although I do not claim the Cornwall section is equal to some other sections, yet by putting energy into the work, we have been able to accomplish results. There is just as much variation in my factories as there is in the factories in any other district, and although we have a number of good makers and good factories, we also have a lot of poor ones. This is just a starting point in the work of elevating the standard of our poor factories to that of the highest, and I appreciate the winning of the trophy much more on that account. I desire to thank the makers who so earnestly worked with me in an effort to win this trophy, and I also wish to thank our worthy chief, Mr. Publow, for the unlimited inspiration he gave us during the year. He encouraged me to go into this prize contest and it was just the energy that we put into the work that enabled us to win.

ADDRESS.

Dr. G. C. Creelman, President Ontario Agricultural College, Guelph, and Commissioner of Agriculture.

It is always a pleasure for me to be invited to a gathering of farmers of any kind. It lends interest to it, when I find a certain number of towns people showing a sufficient interest in agricultural affairs to come out to an entertainment of this kind, and therefore, it is with peculiar pleasure to-night that I see before me quite a number of people from the country and a large number of people from the town. One of the things we have been hoping to accomplish for many years is to bring about in this Province of ours, a better understanding between the people of the country and the people of the town, people who have the same aims, people who are bred alike, people who think alike and act alike. Because one lives in the country and deals in produce and the products of the farm, and the other lives in the town and deals with money and moneyed affairs, seems to have made a barrier between the two which we hope, in the days that are to come, will be broken down and that we will see many, many gatherings such as we have here to-night.

Your Chairman, in opening the meeting this evening, said that there was a sadness to him in attending this meeting inasmuch as so many of our old friends, the original directors and members, who were in the Association with Mr. Dargavel, had passed to the Great Beyond. As I come to-night to a meeting of the Eastern Dairymen's Association in the town of Napanee, I feel as I have felt all day, a sort of sadness come over me when I think of Dr. Charles C. James, who came from this town, and who was such a friend of this Association and one of the greatest friends agriculturists ever had in this or any other country. (Applause). I felt that I must say that to-night, because it was my peculiar pleasure to be with Dr. James during all his agricultural life, and I had the privilege of being asked to speak at his burial.

To-night we are here from all parts of Eastern Ontario, and an odd one from the West, to discuss matters pertaining to the dairy industry in its relation to agriculture, and as I thought over the things that I would like to say here, I came to the conclusion that there was not any phase of agricultural work in which the dairyman was not interested; no matter whether we are fruit growers, growers of grain, roots or forage crops, we have to take off our hats to the dairyman as being the man engaged in the biggest business we have in this Province of Ontario. It is the biggest and greatest in home consumption and export of any of the businesses that we have. Therefore, you are the people, and it is a pleasure to be able to talk to men who are connected with a business that is of more or less importance to us all.

I have picked out some of the common things to say to you to-night, as I feel that you are in a position to listen to a man like myself talking of common things, because with the price you are getting for cheese and butter you are becoming the aristocrats of this country, and you can look upon us towns people and sympathize with some of us who are doing something for the farmer.

One of the important things that the farmer has to consider is the matter of good food. The Assistant Deputy Minister of Agriculture, Mr. Bailey, will speak to you a little later, and show you some excellent views which he has prepared, and which I am sure you will enjoy. If I may be allowed to use some statistics, I would ask you to remember that the field crops grown in the Dominion of Canada amounted to $400,000,000, and does it not seem strange to you farmers who have

been engaged all your lives in the planting of seeds of one kind or another, that you do not give anything like the attention you should to the kind of seed you put into the ground? We depend upon the good seasons and the beautiful climate we have in Canada and a bountiful Providence to bring about a good crop, without our having done very much in the way to see that we planted the very best seed. That has been so much the case, that it impressed us very forcibly at the Agricultural College, and we began to gather seeds from all over the world. After selecting the best seeds, we sent them all over the country to have them tested by farmers, and by that means, you all know that we discovered that very wonderful barley seed brought from Manchuria—a barley that gave five bushels more per acre than any other barley we were growing—and now it is the common barley of the Province of Ontario, and nearly half a million of acres were devoted to its cultivation last year.

Then we took oats and we tried to do something with them, and we have developed two kinds, one No. 72 and the other an early kind called No. 3. We are trying to get these so generally established throughout the country that every farmer will be sure of a good crop of oats.

In fall wheat, we are just able to make an announcement. We have been trying different kinds of wheat. We have a variety called Dawson's Golden Chaff, but the miller says it is too soft, so we crossed it with Bulgarian, and we now have a fall wheat called No. 104, which is just as good, relatively, as the No. 72 oat and the No. 21 barley.

Why do I tell you about these things? First, that you may know about these varieties, and get some of them and plant them on your farms, and second, to tell you how valuable they are. No. 72 oats have been grown on 100 acre plots during the last five years, and yet that seed is so hard to get that at an auction sale at the Winter Fair in December, these oats sold as high as $5 a bushel. They are just as easy to grow as any other kind of oats, and I see no reason why every farmer should not grow them. I am going to advocate, with the consent of our new Minister of Agriculture, the establishment of some seed farms in the Province of Ontario so as to encourage farmers to grow some of these crops which have come to be recognized as the best of their kind in Ontario. I would like to see a Good Seed Campaign next spring, and I would like to see every farmer in the counties of Lennox and Addington go to work and secure the very best seed they can, whether it is oats, barley, or wheat. See to it that you plant the very best varieties that can be procured, and thereby increase your production.

We are beginning to look into the subject of growing root seed, because it may be probable that if we do not, we will not be able to get any mangel, beet or turnip seed, as so many of these seeds come from France and Germany. We have found by actual experiment, that we can grow just as good root seed in this Province as can be grown anywhere else in the world, and you will have an opportunity next season of demonstrating that fact, and you people who live in the town of Napanee may even find that it may be desirable to look into this matter of growing root seed in your back gardens.

The next thing that we will have to take up in the Province of Ontario with more energy than ever before is the subject of good roads. Why should I have to repeat this, and why is it that public men have to repeat these things year after year, when we know that all these things are absolutely essential and necessary for the development of the country and for the comfort and well-being of the people who live in it? I am not going to repeat it, but I am going to say to you that

when I visit different States of the American Union and have an opportunity to speak, I can generally score by telling them about our dairymen and what wonderful work they are doing, and by telling about our good farmers and the great crops they are producing in the Province. And when I speak of our cattle, sheep, and swine and poultry, I can always say we have just as good and better than they have in any part of the world. But when it comes to the matter of good roads, I always evade the question, and get out of town as quickly as I can. If I were to put the question to you to-night: "Are we as good agriculturists, are we as fine in every way as the people of the State of New York?" you would say "Yes," and you would be right; and yet the Legislature of the State of New York borrowed $100,000,000 in one day for good roads. When I was in California, I travelled over their roads in a motor, and I said to the man, "When we get off this road, I suppose we will stick in the mud." He said, "You cannot get in the mud in California; we have spent over $100,000,000 on roads, and our Legislature has just voted $18,000,000 more to keep them in repair." Then I began to talk to him about potatoes and things that we grow in Ontario. I did not want to say anything to him about Ontario roads. I want to say to you seriously, that I believe the best thing any county or township could do, would be to build a good piece of metal road somewhere in the mud so that all the people who travelled on it would drop off of it into the mud, and then they would see the advantage and benefit of a good piece of road. Surely we are as good people and deserve as good roads as the people of any other country!

The Department of Education of the Province of Ontario has tried during the last 25 years to put on the Statute Books of this Province things that would help rural communities and municipalities to have better schools than they had the year before. I do not know of any rules and regulations that are better anywhere on this continent than the rules and regulations governing the schools and school matters in the Province of Ontario, but the school business is like any other business. You have got to come down to the individual who lives about the school if you are going to get a first-rate school and give your children a first-class education. I am delighted with our laws, and I am delighted with our officials and with our organization, but I am disgusted with the way they are carried out. Now, I do not need to go to the other side of the line for an example this time, but I go to Manitoba, that little new Province where they have to put up with 35 below zero as I stand on this platform to-night, and where the wind is blowing a gale. We are sitting in this hall warm and comfortable, and yet if we went to one of our school houses to-night we would have to turn up our coat collars, while in Manitoba, they can sit down in comfort. In the Province of Manitoba, they have built great consolidated schools where they teach Domestic Science and have classes in agriculture, and their schools are just as good as any schools we have in our towns, even though they are away out on the prairie. They have a motto there which reads like this: "What is good enough for your boy is not too good for mine," and you parents want to take that matter into your own hands and see that you have decent school rooms for your children. See that they are well ventilated and warm and that they have good school yards where the boys and girls can go out and not be ashamed to think that they have to play in such a miserable dilapidated-looking school yard. Have trees planted around the school house, and do not let your neighbour steal your good teacher by giving an increase of $50 more a year.

We are doing too much blowing about Ontario, and about our being the "Salt

of the Earth." Why are we able to do it? Because God Almighty gave us one of the best pieces of soil under the blue sky, with lots of sunshine and plenty of rain fall, and because without doing very much we can reap a bountiful harvest and then sit down and say, "We are the people and wisdom will die with us." Now, wisdom will not die with us if we have to be educated in the schools that we have in the country places, where the children have to sit on seats so high that their feet cannot touch the ground, and where they have not sufficient interest to go out and play, and where they have a 17-year-old girl trying to teach them the things that are going to be useful to them all the rest of their lives. For the sake of the people that are to come, let us have better schools and better teachers, so that our boys can grow up and learn something about the work they will have to do in the future, and so that the girls may not only learn all that their mothers know, but more about the value of the different kinds of foods that they will put on the table for their husbands and children in the days that are to come.

Then, we want electric power. We have water powers all over this country, and the Government is anxious that we should embrace our opportunities and harness these powers and use the electric energy on our farms. Can you think of anything that would more uplift the farmer and the farmer's wife and make their social life better than to be able, when darkness comes on, to press a button in the stable and finish the work, and then come to the house and have it lighted throughout by the water powers that are back of your farms? These things ought to be and we ought not to wait too long for them, because life is too short and there is no reason why we should wait and have our grown children enjoy things that we ought to be enjoying ourselves.

Then we want general improvement in the rural home. I can say these things to you a little more forcibly because I have to handle 1,500 young people, the majority of them from the farms of Canada—10 per cent. from other countries of the world. These boys and girls are sent to the Agricultural College at Guelph, and when I see them first, as they come from the farms, some of them are homesick, and I sometimes take one of them in my buggy and drive him out in the country and talk with him, I say "What did you come to school for?" and he will say, "To improve myself," and I say, "Why could not you improve yourself in your own neighbourhood?" And his answer generally is, "I learned all that I could, and my father wanted me to come and I came, and I am here and I am homesick." I say to him, "What is the matter?" And his reply is, "Your place is so lighted up with electricity that it is not natural to me, and when I go into my room, I simply turn the tap and I can get water to wash my hands and face, and I can have a hot water bath and a great big shower bath, and when I see these ventilators in the windows and cool air coming into my room, everything is so different from what I have at home that I think it is too much for me, and I want to go back." I say to these young men, "I would not go back if I were you until I can take all these things with me." I want every boy to go back from the Agricultural College at Guelph so pleased with what he has learned there that he will want to farm all the rest of his life, but I want him to go back so dissatisfied with the things that are on the farm, as they are on a great many farms in this Province, that he will not rest until he gets them remedied and has running water in the house and electricity, and something besides man power and horse power on the farm to do the heavy work, and until his home and fireside are as comfortable as the home of the city man, and until he has trees and flowers and an orchard that gives him pleasure, and he is just as much entitled to all these things as anybody else on the

face of the earth. Is not that a right ideal to hold before every boy? We do not want to have the preponderance of power in the towns and cities, and when this state of affairs on the farms of this country is the order of the day, you will not be represented in the Legislature by lawyers and doctors, but you will be represented by farmers, and you will find the people in the towns making money and the farmers doing the hard work, but the farmer will be able to sit down and know that he is just as good as anybody else, and he will have a pride in his home and an interest in seeing that everything is comfortable, and he will not then say, "I am only a farmer," but he will say, "I am a farmer and I am proud of it." That is the ideal I try to instil in the boys at the College.

We must do a little more thinking as to the way we handle our products after they are made. This does not apply so much to the cheese men, because you have done that. You have a cheese board, and you sell your goods in a business-like way, but did you ever hear of them selling potatoes or turnips or cattle or horses or sheep or swine down to a fraction of a cent as you sell your cheese? We sell our apples at whatever price the buyer will give us in the fall. We know that apples are always worth about $1 or $1.75 in the orchard in the fall, and yet we never knew a year when they were worth less than $3 or $4 a barrel in the city, and some years they are a great deal higher than that. Yet, we have no method of cold storage so that we can hold these things until they will bring a good price on the market. I remember when I was a boy, we always put the apples in pits and we would go out there after the first thaw in January and get some out, and they would come out sound, and we had good apples all the year round, but we do not do these things now.

I was up in the Niagara Peninsula not long ago when apples were selling at from $4.75 to $7 a barrel, and yet a great many of the farmers had sold them at $1.75 a barrel in the orchard. We must have some co-operation, because individual farmers cannot afford to build storehouses, and we have got to make up our minds that we must pay a man a decent salary to run the co-operative organization for us. If we pay him $1,000 a year, it is cheap if he makes us 10 per cent. advance on our money instead of a loss of 5 per cent. We have to get over the idea that because a man is making $1,000, $10 or $12 or $15 of which comes out of us, that man is robbing the community. We never stop to think that the lawyer or the doctor who is doing business for us, and who charges whatever he thinks is right or whatever he feels like, he is robbing us. We have to get together and co-operate, and we have got to ask ourselves, "How can we get better schools, better seeds, good roads and all these things that are necessary to comfortable life on the farm?" We must stick together and forget politics—I was almost going to say forget religion. We must forget everything but the matter that is before us, and above all, to get the young people to help in this great work.

Some boys who come to Guelph tell me that they have almost to run away to get to College; first, because they want an education, and second, because they want to get away from home. I say to them, "Have you not got good parents?" And they say, "Yes, the finest in the world; but when I go home to father and tell him about what some speakers have said at a meeting, he will say, 'Oh, that is all right for those fellows to talk that way; they are paid for doing it.'" But these young men have been working on the farm until they are 20 or 21 years of age, and they want to know if there is anything better in life for them, and if there is, they want to get it, and I say to them, "Yes, there is something better; there is no reason why farm life should not be much better than it sometimes is." Some

people say the reason the boys leave the farm is because of the glare of the city and the 5 cent shows, and the electric lights, and the Great White Way, but these young men say to me that it is not so. It is not the attraction of the city that is causing the country boys to go to the city; it is the barrenness of the life in the country. The old people are satisfied to sit down and take their book or paper and enjoy the evening hours, or to go to bed with the chickens and get up and worry the pigs and ducks before daylight the next morning; but that is not what the boy enjoys. Youth must be served, and the boy and girl of this generation want something else besides watching the old man read the newspaper and hearing the old lady grumbling because you ought to be in bed, so as to get up in the morning before daylight.

I have written out here what I have been pleased to call The Country Boy's Creed and the Country Girl's Creed, and I would like every country boy to have a creed something like this:

THE COUNTRY BOY'S CREED.

1. I believe that life in the country can be made just as pleasant and profitable as in the city.

2. I believe that father and I can form a partnership that will suit both of us.

3. I believe that if I kill every weed on my father's farm we shall be well paid by the increased crop alone, to say nothing of the benefits to our neighbors.

4. I believe that by careful selection of our chickens I can double the output of the flock.

5. I believe that by introducing alfalfa on our farm we can keep twice as many domestic animals as at present.

6. I believe that by keeping twice as many animals, we shall be able to grow much larger crops of alfalfa and other things.

7. I believe that by planting shade trees, growing flowers, and shrubs and by keeping a tidy homestead, we shall be better contented and happier in every way, and our farm will increase in value.

8. I believe not in luck but in pluck.

9. I believe that farming is a most honorable calling, and having decided to stay on the farm, it is my duty to make the best use of my time, now in school, that I may be the better farmer in the days that are to come.

10. I believe in working when I work and playing when I play, and in giving and receiving a square deal in every act of life.

THE COUNTRY GIRL'S CREED.

1. I believe that I have a right to be happy every day.

2. I believe that God's blue sky and God's green earth are a part of my heritage.

3. I believe that I have a right to love little chickens and ducks and lambs and puppies as well as dolls and ribbons.

4. I believe that I could take care of these things as well as my brother, who does not love them as much as I do.

5. I believe that I should love to keep house better than anything else, and I only wish they taught housework at school.

6. I believe that keeping a garden "all my own" would be great fun, and I believe that I could be very happy in giving away the flowers, and in cooking the vegetables that I raised myself.

7. I believe that I could study real hard at my Grammar and Geography and Arithmetic and Spelling if I could do cooking or sewing with the other girls in the afternoon.

8. I don't want to go to town and leave my father and mother and my brothers and sisters to live in the country, for I know I should miss them all, and the trees and the creek and the green grass and the old woods and everything; but, oh! I don't want to stay at home and do nothing but wash dishes and carry water and do chores and grow old like auntie. I want to laugh and love and live.

9. I believe I can learn to sew and cook and do laundry work and do them well. And I want to learn them and I want to do them well.

10. I believe in the square deal for girls as well as for boys, and I want everybody to be happy all the time, the old as well as the young.

ILLUSTRATED ADDRESS—AGRICULTURAL CONDITIONS IN EUROPE.

C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture for the Province of Ontario.

Mr. Bailey exhibited a most interesting and instructive lot of views, and gave helpful explanations. Following this, he gave a brief address:—

I am sure it affords me great pleasure to have the honor of being present to-night and meeting with the dairymen of Eastern Ontario. It is not my intention to discuss dairying matters to-night. I am simply going to try to tell you a few things of some of the conditions that I found in Europe when I toured through some of those countries some two or three years ago. I do not think you can say that the farmers of Europe are prosperous when you realize that many of them are confined to from two to fifteen or twenty acres of land, and as a result of that, land in Germany is valued at from $400 to $500 an acre. On those plots they simply grow oats, barley, rye, potatoes and a few chickens and an odd pig or two. You can readily understand that they will not handle many dollars. The life of European farmers is exceedingly simple, and their standard of living is particularly low, and what seems to them a fairly large bank account, would look to you more like something to spend on a holiday trip. That is the difference I see between a European farmer and the farmer of this country. It is true that much progress has been made in some of the European countries in the way of increased production. Take Germany, a country that has a very poor soil; it is not at all fertile, but rather a light sandy soil, and yet owing to the fact that they have used good seed and have been careful in the selection of varieties and have used fertilizers very extensively during the past 20 years, they have succeeded in almost doubling the yield per acre of most of their farm crops. How is it they have been able to do that? I venture to say we spend more time talking about the value of improved seed and the use of fertilizers and the breeding of good stock than they do in Germany, but the difference is that they are not a free people. My impression of the German farmer was that he was in semi-slavery. The agricultural expert was not in his class; he was a professional man

going amongst them, and to him they had to take off their hats. This expert tells the farmer what he has to do and he does it. As a matter of fact, he does not ask the reason why, and as a result he has prospered because Germany makes him apply himself to his business. Why has Europe succeeded in co-operation? Because of the dire necessity of doing something to keep alive, the people are forced to get together to exist, and co-operation has proven to be the right thing to do. The people there realize that unless they co-operate, they cannot prosper and co-operation has developed in all these countries, and the people have been brought up with the idea that co-operation is the best thing for them. In this country, our farmers are inclined to be a little too independent; they like to do their business in their own way. They do not want to do it in the same way as their neighbors, and that is just one weakness of co-operation in this country.

Another weakness is that we have not sufficient confidence in ourselves. We are afraid to risk a few dollars in getting the organization started. Frequently we get too cheap a man to manage the organization. In Europe it is just the other way. They are not as independent as we are and they must co-operate in order to succeed.

Then there is the matter of agricultural education. There is no doubt they do more along scientific lines than we do. They have had the District Representative there for twenty years, but they haven't the same equipment that our District Representatives have, and they haven't as many opportunities for doing effective work. One of the weaknesses of the District Representative in Europe is that many of them never worked on a farm, they are too much of a gentleman to work on a farm. They feel that they are in a different class. They are the big fellows who go around on horseback, and tell the farmer what to do and how he should do it. In Canada, and Ontario especially, we always strive to get men to go out on this work who have a thorough knowledge of farm work and who have the right viewpoint. I prefer the system we have in this country to that of Europe. We give the people a chance to develop themselves; our people are not under government control as they are in Europe.

There is no doubt that there is going to be a great depletion of live stock in Europe, and it is said by some that there will be a great demand for breeding stock. I do not believe that you can get these people in Europe who have been breeding live stock that are absolutely different from ours to take our breeding stock. I think they will re-establish their own breeds from what they have left when the war is over. In the meantime there will be a great demand for all kinds of meat products in Europe. I also believe that there will be a great demand for horses and for horses for breeding purposes.

I desire to thank you for your very kind attention and the pleasure you have exhibited in the views I have shown you. My one impression as I went through Europe and looked around at the farmers of these different European countries, was that I was never so proud before of the fact that I was a Canadian and lived in this Ontario of ours.

Dairymen's Association of Western Ontario

The Fiftieth Annual Meeting of the Dairymen's Association of Western Ontario was held in the Town Hall, Woodstock, on the 10th and 11th of January, 1917, and proved to be one of the best and most largely attended conventions held.

PRESIDENT'S ADDRESS.

James Bristow, St. Thomas.

It affords me much pleasure as President to welcome you to the Fiftieth Annual Convention of the Dairymen's Association of Western Ontario.

The county of Oxford, the city of Woodstock, and the town of Ingersoll are historically associated with the dairy industry. It was near Norwich in this county that the first Canadian cheese factory was started in the year 1864, and the organization meeting of this Association was held in the town of Ingersoll in 1867. Think of the wonderful progress since these dates and how dairying has been adopted in all parts of Canada as the keystone in the arch of Canadian agriculture.

When the first meeting of the members of the first Ontario Dairymen's Association was held, those present at that time probably did not realize the importance of the work which they were then doing, but results have shown that they had vision, they saw the possibilities in this province and in the Dominion for a wonderful growth of the dairy business.

Every country in the world laying claim to progressive civilization has adopted to a greater or less extent the fundamental principle of dairying in some form as a basis for maintaining soil fertility and thus assisting productive agricultural operations.

Provincial and Federal Governments have wisely assisted the dairy industry, and have done everything possible to help build up this branch of Canadian agriculture in which millions of dollars are invested, and which yields to the prosperity of the country to the extent of probably one hundred and fifty millions of dollars each year.

The outstanding feature of the dairy business as may be applied to conditions in Western Ontario may be briefly summarized as follows:—

(1) War conditions have stimulated the export trade in dairy products beyond expectations. The scarcity of dairy products throughout the world and the heavy demand has advanced prices to a point never before realized.

(2) Labor is scarce and the cost is advancing although production of dairy products has greatly increased during the past few years, the question of labor will be one of the chief factors in connection with future productions, feed of all kinds for maintaining dairy herds is nearly doubled in price, the capital required to invest in dairy cows is nearly double, milk producers are endeavoring to increase the production of the individual cow, the farmer is not receiving an unfair price for his dairy products under present conditions.

(3) The population of cities and towns is growing and requires increasing quantities of milk and cream, the ice cream trade is becoming a factor in the use of milk fat; the consumption of dairy products in every part of America is increasing, the future opportunities of the dairy farmers is most encouraging.

(4) The milk condensery, milk powder factory and auxiliary city milk supply plants are branching out and securing control of the cheese factories in certain localities; a number of our best cheesemakers also are leaving the business for various reasons which is to be regretted.

May I call your attention to pages 16 to 23 of the programme. These pages give a brief history of the Association since its inception.

The season just closed, shows up to December 16th an increased quantity of cheese and butter exported. Canada exported about 175,000,000 pounds of cheese and 40,000,000 pounds of creamery butter, an increase over 1915 of approximately 18,000,000 pounds of cheese and 7,000,000 pounds of creamery butter.

The home market consumes about $100,000,000 dollars worth of dairy products per year, which means that the home market is very important and everything must be done to supply this market, but the export trade is a great factor in the prosperity of Canadian dairymen, and every assistance should be given by the producer and every one connected with the trade, to those who have the matter in hand, to continue to keep up the export trade satisfactory in every way and to meet its requirements.

Let us continue to furnish a quality of dairy products second to none manufactured anywhere in the world.

DIRECTORS' REPORT.

Your directors beg to submit the following report. The season just closed was not so favorable for the production of milk as that of 1915, owing chiefly to the warm, dry period that set in about the end of June and continued well into the summer. Pastures became short on account of the unfavorable wet, cold spring, fodder crops with the exception of hay, were not equal to other years. Feed in several sections is high and scarce and therefore the total production of dairy products will be somewhat less than that of the previous year.

The increased export demand for cheese and butter, due chiefly to war conditions, has created unprecedented high prices, which were maintained up to the end of the season. These high prices, will to some extent make up for any loss from underproduction. Indications point to increased outlets for milk as the condensed and milk powder factories are branching out and have taken over several cheese plants. The milk distributing companies of some of the larger cities have also secured control of a few cheese factories.

There has been practically no export of cream during the past year, high prices for butter in Canada together with the heavy shipments abroad disposing of all the surplus in the form of finished products.

An increase in the number of cream buying stations is noticed. We again wish to express our doubts of the wisdom of this movement on account of possible deterioration of quality and general lack of uniformity. Intense competition usually results in the acceptance of inferior raw material.

This is the third report of your directors since the beginning of the war, and we wish to repeat a sentiment expressed in our last report, to the effect, that "although there may be a temporary drop in the prices of dairy products after the war, especially during the readjustment period, the hope is expressed that should prices decline for the time being, this may not influence milk producers

to decrease their herds, but to continue to make dairying a permanent feature of their operations, for past experience has proven that there is no other line of agriculture which for a period of years pays better than dairy farming." We feel it our duty to mention the increased cost of factory supplies and help and to point out the necessity for some readjustment of manufacturing prices to meet the changed conditions.

MEMBERSHIP. Your Association has a membership of 268. Subscription to *Farm and Dairy* is included in the membership fee of one dollar.

SPECIAL OFFICER. A special officer was again employed to deal with cases of milk deterioration. Forty-three cases were reported and fines from ten to fifty dollars were imposed.

DAIRY HERD COMPETITION. The prizes for the Dairy Herd Competition were increased this year, and the Canadian Salt Co. and Ryrie Bros. again very kindly donated a silver cup and silver and bronze medals respectively. The silver cup will become the property of the present holders, Jas. Burton & Son, Sparta, as it has been won twice in succession. We wish to congratulate these gentlemen and feel that what they have been able to accomplish will stimulate other milk producers to endeavor to reach a similar standard. This is the highest number of pounds of milk per cow for six months period of any previous entries in this Competition. We believe this Dairy Herd Competition has been the means of starting some of our present progressive breeders of high producing dairy cows on the way to permanent success and has by example assisted to a great extent many other milk producers.

DAIRY EXHIBITION. Your directors decided to extent the prize list this year which we trust meets with your approval. We wish to express our sincere appreciation of your support. The Dairy Exhibition has been a strong factor in improving the quality of our cheese and butter and also in advertising our products in the home market and is an interesting special feature of our Convention. We wish to especially thank the members of the Toronto Produce Exchange for the donation of the splendid silver shield for our Winter Dairy Exhibition. We also thank all others who contributed special prizes.

INSTRUCTION WORK. A new feature in connection with dairy instruction work is the beginning made by the Ontario Department of Agriculture, in the market grading of butter, which is now in the initial stage. The important work of dairy instruction was carried on in the usual way during the past year and is a strong factor in securing continued improvement in the raw material and finished products. A full report will be submitted by the chief instructor.

SPEAKERS FOR ANNUAL MEETINGS. The Dairy Branch of the Department of Agriculture again provided speakers for the annual factory meetings. This is excellent work and will be continued during the present winter.

LEGISLATION. At the last session of the legislature the Dairy Standards Act was passed and comes into force in March next. This Act should, with the co-operation of all dairymen, eventually prove a strong force in the improvement of dairy conditions and it is hoped will be accepted as one of the most progressive of the dairy Acts which have yet been enacted by the Provincial Government. The Dairy Products Act was amended at the last session of the Provincial Parliament, making it necessary for operators of milk and cream buying stations to take out permits for testing milk or cream.

BOARD MEETINGS. Your directors have endeavored to transact the business of the Association to the best of their ability. We appreciate the work of both

the Federal and Provincial Department of Agriculture and the whole aim of this Association is to place the industry on a solid basis and endeavor to keep the quality of our products second to none.

Fifty Years of Progress. This is the fiftieth year since the organization of this Association. On pages 16 to 23 of the Annual Programme you will find a brief history of the Association and the cuts of past presidents and secretaries. These pages we believe will be much appreciated not only by the older members but the younger members as well. Long before the next fifty years has gone by many of us here present will have passed away. We urge the younger men to take an interest in the work of this Association and to continue to make the record of the future even greater than that of the past.

We wish to express our sincere regret of the deaths of the late Hon. Jas. F. Duff, Minister of Agriculture for Ontario, Dr. C. C. James, Agricultural Commissioner for Canada, and Hon. D. Derbyshire, for many years President of the Dairymen's Association for Eastern Ontario. Dairymen have sustained a loss through the death of these men which can never be replaced.

Dairymen's Patriotic Fund. Since the last report, $193.85 has been received, $83.85 from the Ripley Cheese and Butter Co., and $110.00 from the German Union Cheese and Butter Co. This makes total receipts for this fund up to date, $5,077.58. This amount has been distributed as follows:—

Canadian Red Cross Fund	$1,176 85
Belgian Relief Fund	1,000 00
Canadian Patriotic Fund	2,900 73
	$5,077 58

The fund is still open and contributions from any factories or individuals will be thankfully received.

The Secretary, Mr. Herns, presented financial statement. (See page 6.)

Moved by Mr. J. N. Paget, seconded by Mr. Stratton, that the financial statement as read by the Secretary be adopted. Carried.

REPORT OF DAIRY HERD COMPETITION, 1917.

The second silver cup, donated to this Competition by the Canadian Salt Co., Windsor, through their General Manager, Mr. E. G. Henderson, becomes the permanent property of Jas. Burton & Son, Sparta, who have won this cup in two consecutive years.

The bronze medal, donated by Ryrie Bros., Toronto, and ten dollars in cash donated by the Dairymen's Association of Western Ontario, were won by E. L. Early, of Kerrwood.

The Winners.

Class 1.—Cheese Factory Patrons.

Jas. Burton & Son, Sparta, Sparta Cheese Factory; 190 acres in farm; 14 grade cows (12 grade Holstein and 2 grade Durhams); 119,553 total pounds of milk; 8,540 pounds of milk per cow.

Class 2.—Creamery Patrons.

E. L. Early, Kerrwood, Kerrwood Creamery; 150 acres in farm; 6 Shorthorn grade cows; 878.8 total pounds fat, 146.46 pounds of fat per cow.

MR. EARLY'S METHOD OF HANDLING HIS HERD.

One cow freshened in January, two in February, three in March. Were fed through winter on clover hay, corn stalks and mangolds with about one quart of principally, oat chop per day. The chop was continued until end of May. For June and July nothing was fed outside of pasture. About August 1st pasture began to fail, began to feed green corn twice per day.

Cows were milked regularly, six o'clock in the morning, seven in the evening. Had access at all times to salt and fresh water, which had to be pumped.

It is but fair to state that had Mr. Early any intention of competition for a prize he would have made a much better showing, as he kept out daily what milk was needed for the family, and estimates that cream enough was also kept out for butter and family use, to make at least three pounds of butter per week.

SPARTA, Ont., January 2, 1917.

MR. FRANK HERNS,
London, Ontario.

DEAR SIR,—In reply to your request as to the building up and management of our herd. Fifteen years ago our herd consisted of grade Durhams. We thought in those days any other breed was not much good, but as time went on we replaced some of our vacancies with a Holstein or two. We found shortly after that the general run of the Durham breed could not compare with Holstein for high production, and especially for persistency. We have not been raising any of our calves, selling them all when first born. We thought it more profitable to buy matured cows than to rear them. This year we raised three, thinking at the way the prices for dairy cows are soaring it was high time for some of us dairymen to raise some. From our last year's herd of eighteen we weeded out four of them, as is always our custom every year to weed out the poor ones, replacing them to the best of our knowledge with higher producers.

As to the management of our herd, care and regularity of feeding are the very essential points. We generally manage to have our cows dry from six weeks to two months, the latter preferred. During this period it is our special desire to get them in as good condition as possible. A cow freshening in poor condition cannot produce like one in good heart. During the months that they are being stabled they are turned out twice daily for water and exercise. We give them a little salt on a little chop or bran every day during this period. Some men advocate having it in a trough for them to help themselves, but we find that a poor way. We prefer feeding it to them, for some cows when allowed will eat too much, while others not enough. We have our cows freshen in February, March and April as nearly as possible. We feed them plenty of sugar beets along with their grain ration, composed of one-third corn and two-thirds oats, chopped together. This, along with clover hay for roughage, gives them their diet until grass comes. About the 24th of May we figure on them being turned out to grass. We still continue the grain and roots for ten days or two weeks—they at this period were giving an average of sixty pounds per day. By this time they are pretty well used to the change from dry feed to grass, so we take the grain away from them for a period of from three to four weeks. We think during this period, while the grass is very new and juicy, grain is of little use to them. About the 10th of July we started giving them about three quarts of bran twice daily per cow. A little later we started giving them about two quarts of oat chop along with three quarts of bran, pasture by this time getting pretty dry. About the 1st of August we turned into our second growth of pasture on the hay fields, we being lucky this year to cut our hay early, being nearly through by the 1st of July, thus giving clover a start before the dry weather struck us heavily. We frequently change our cows from one pasture to another, even if no better. During September and October, finding that the extreme drought was getting serious, we found it ncessary to increase the feed in some way, so we fed them a little linseed meal twice daily along with their grain ration. We have plenty of grass, such as it was, but this season being so dry it was not juicy enough for the milk supply.

In 1915 our herd consisted of eighteen cows, producing in the six months, from May 1st to October 31st, 7,175 pounds per cow. Thus we will see by weeding out to fourteen and giving them more attention, they produced 8,540 pounds per cow in 1916.

We heartily wish to express our appreciation for the cup given as a prize from the Canadian Salt Company, Windsor, and also wishing a Prosperous and Happy New Year, we are,

Yours very truly,
JAS. BURTON & SON.

Special prizes were offered for Dairy Herd Competitions as indicated below:

Two Diamond Hall Medals (enclosed in handsome cases), donated by Ryrie Bros., Toronto.

One Silver Cup, donated by the Canadian Salt Company, of Windsor, Ont.

CLASS 1.—FOR PATRONS OF CHEESE FACTORIES.

To the patrons who furnish the largest amounts of milk per cow to any cheese factory in Western Ontario from May 1st to October 31st, 1916, from herds of eight cows or over. 1st prize a Silver Cup, to become the property of the patron who wins the same three times or twice in succession, and $5.00 in cash; cup won 1915 by Jas. Burton & Son, Sparta. 2nd prize, a Silver Medal, value $10.00, and $5.00 in cash. 3rd prize, $5.00 in cash.

CLASS 2.—FOR PATRONS OF CREAMERIES.

To the patrons who furnish the largest amounts of butter fat per cow to any creamery in Western Ontario from May 1st to October 31st 1916, from herds of 6 cows or over. 1st prize, a Bronze Medal, value $10.00, and $5.00 in cash. 2nd prize, $6.00 in cash. 3rd prize, $5.00 in cash.

RULES OF DAIRY HERD COMPETITION.

1st. No herd of fewer than eight cows in Class 1 and no fewer than six cows in Class 2 will be allowed to compete.

2nd. Figures must be taken from the cheese factory or creamery books, and the number of cows and the total average amounts of milk or butterfat must be certified to by the cheese or butter maker, and the secretary of the cheese factory or creamery.

3rd. The average amount of milk or butterfat per cow must be calculated on the basis of the total number of cows from which milk or cream is sent to the factory during the season of six months, May 1st to October 31st, 1916.

4th. No substitution of one cow for another will be allowed.

NOTE.

Example 1.—If a patron begins to send milk or cream to the factory on 1st of May from, say, eight cows and continues to send to the 31st of October, from the same herd, he is eligible. Larger herds the same.

Example 2.—If a patron begins to send milk or cream to the factory on 1st of May with, say, only seven cows in milk, and in June, or at any other time, another cow freshens, and in July, or any other time, another cow freshens, making in all nine cows, the patron is not barred from competing, provided the total number of cows (9) is used for dividing the total milk or butterfat to find the average amount of milk or butterfat per cow for season. Larger herds the same.

Example 3.—If the patron begins to send milk or cream to the factory on May 1st with, say, eight cows, and in June, or any other time in the season, for some cause, one cow drops out of the herd, the patron is not barred from competing, providing the total number of cows (8) is used in dividing the total milk or butterfat to find average amount of milk or butterfat per cow for season. Larger herds the same.

Example 4.—If the patron begins to send milk or cream to the factory on May 1st with, say, eight cows in the herd, and some time during the season, for some cause, one or more cows drop out of the herd, the patron will not be allowed to substitute a new milch or any other cow in order to keep up the milk from the herd. Larger herds the same.

COW CO-PARTNERSHIP.

C. F. Whitley, Ottawa.

May I say what a very great pleasure it is for me to attend the 50th Annual Convention of the Dairymen's Association of Western Ontario and look into so many familiar faces. I am sure that a word of congratulation to the directors is in order. This Association has made such great improvement during the past few years, and I am sure you all feel proud of what you have been able to accomplish.

You will notice that the title of the few remarks I have put together I have ventured to call "Cow Co-partnership."

In the science and practice of dairying, it is recognized that several factors contribute to success. At a dairy convention only a few can possibly be considered, so may I offer a remark or two concerning man's finest servant, and how her service may be rendered still more useful through cow testing?

"Finest" was used advisedly, for what domestic animal is more patient, more completely useful than the dairy cow? Some day a poet laureate will appear to immortalize her, redeeming her from the joke page of a fifth-rate artist's so-called comic paper: she well deserves it, for day in (and night out) she works unceasingly, ungrudgingly, with no expectation of reward. To her we all may look in admiration; on the character of some of us perhaps, she, the symbol of contentment, the perfect embodiment of exquisite unselfishness may have some reflex action. The extent of her enormous task is not always fully appreciated, the giving of her actual self in the breaking down of tissue, while laboring at the secretion of milk 24 hours per day—a contrast indeed to an average farm horse, working less than five hours per day and costing far more than Bossy to feed.

Every man is interested in the upbuilding of the dairy industry, believing that it makes for the prosperity of our glorious Dominion. It is an old truism that the foundation of good dairying is the cow: but please note, not any common, ordinary old cow, but the cow of distinction, selected on her records as one worthily filling her mission of profitable yields. Obviously due credit should be given to each partner-cow for her contribution to the total wealth of the firm, the point is that we need it down in black and white whether she delivers the goods to the extent of 150 or 350 pounds of fat. On that important point cow testing alone can satisfy your enquiring mind.

To get the best results this co-operation evidently must be genuine, complete not fragmentary. Are all of our dairy cows to-day getting a square deal? From the humane standpoint it appears that some merit better treatment; here and there the milk of human kindness needs to be clarified so as to leave no sediment of ungentleness. Our cow testing records indicate plainly that where the alliance between the herd owner and the cow is one based on honest dealing, there is ready response on both sides; the cow does better as she is treated better, and the owner does better as the cow, through the milk records, teaches him her needs.

A herd in one of our Ontario dairy record centres has a marked instance of the direct results of such treatment, with an increase in yield from 5,460 lbs. milk to 9,428 per cow in two years—seventy per cent. more milk from the same cows.

In the table following some remarkable contrasts are to be found.

COMPARISONS IN A HERD.

Average yield, 18 cows, 4,915 lb. milk, 3.4 test.
" " " 161.6 lb. fat, value $56.56.
" profit, 10c. per lb. fat, feed cost $40.00.

Cow No.	Lb. Milk.	Fat Test	Lb. Fat.	Value Fat at 35c.	Profit per lb. Fat.
				$ c.	c.
1	3,440	4.0	140	49 00	6
2	3,550	3.8	137	47 95	6
3	6,210	3.7	234	81 90	18
4	3,474	3.5	123	43 05	2½
5	5,460	3.5	194	67 90	14
6	4,520	3.2	147	51 45	8
7	9,750	3.1	307	107 45	22
8	5,316	2.8	151	52 85	8

These figures reveal contrasts that occur frequently. In this herd of 18 cows the average yield is 161.6 lbs. fat: omitting the ten nearest that average, the individual tests are seen to run through the whole scale from 2.8 to 4.0 per cent. of fat. The lowest yield of fat is from a six-year-old contributing only 123 lbs. of fat to the general wealth; on this is made, above the feed cost of $40.00 a profit of barely two and a half cents per pound of fat. The highest yield is from a seven-year-old giving 307 lbs. fat, on which is made a profit of twenty-two cents per pound, *more than eight times as much.*

With the eight cows tabulated above, the profit is $22.65 per cow above feed cost: but if the three lowest yields of fat are omitted from the eight, the profit stands at $32.45 each, or almost *ten dollars* additional per cow.

In the real community, where pooling and harmony of interest are maintained, good results are apparent. Where all the partners are active, not sleeping; where each is thoroughly interested in the live, going concern; where complete understanding exists; where the working basis is sensible and economical; what a chance there is for abundant production! And the selected cow rises to the bait every time.

For where our cow testing work is in operation we find districts averaging 6,000, 7,000 and 8,000 lbs. milk, over 240 lbs. fat per cow for as many as 500 cows.

Can you by such study improve your present output? Do your 10 cows bring you $350 clear profit? Will any of your cows give two dollars and fifty cents worth of butter in return for one dollar and a quarter's worth of grain? Do you get better results from feeding 1 lb. of grain for every 2½ lbs. of milk produced or for every 5 lbs.? Can you get 5 per cent. or 20 per cent. net profit on your investment? Does Old Spot give you 9 or 19c. profit on each pound of fat produced? Such questions are answered definitely by cow testing, for its modern business methods rest mainly on attention to the individual in order that resulting totals may be classed A 1; attention, that is, to each as an individual, living mother, not as a dead, inanimate machine, or as machine-made, turned in a lathe to one pattern.

If one should be tempted to ignore the wisdom of linking arithmetic with cows, it may be well to remember that this ancient and exact science of numbers helps tremendously in every phase of modern preparedness. Not a battleship moves, not a gun is fired, not an aircraft soars, but figures are used, checked and re-

checked. In the dairyman's war against loss he wisely counts, daily he calculates where saving retrenchment can be made, where advances are justified, from the elevation of his superior intelligence he computes values; at every turn he needs arithmetic.

Our dairy cows throughout the Dominion consume probably eighty million dollars worth of feed a year. This is a business worth figuring about. Assuming a successful farmer works three thousand hours in a year, how much per hour do your cows make for you?

Whether cows are of correct structural style of architecture befitting their breed, or incline more to the ornamental, they will be subjected to the finding of the scales and test by men who are particular. The precise dairyman, the successful one, wants no trappings and trimmings till the fundamentals are assured, the solid base on which he builds must always be the selected cow, his plans and specifications are records of milk production and feed cost.

The argument for this partnership with cow capitalists may be further clinched. Cow testing educates the herd owner, whether young or old, and necessitating only a nominal first expenditure must appeal to those who seek affluence.

INCREASES IN YIELDS, LISTOWEL, ONT., DAIRY RECORD CENTRE.

(In Four Years of Cow Testing.)

Herd.	No. of Cows.	Last Year's Yield.		Increases per Cow.		Per cent. of milk Increase.
		lbs. milk.	lbs. fat.	lbs. milk.	lbs. fat.	
A	9	7,309	260	3,528	132	93%
B	17	8,625	275	2,970	90	52
C	5	9,445	300	3,216	108	51
D	9	10,118	339	3,049	100	43
E	10	10,197	333	3,541	114	53
F	16	10,391	360	2,762	114	36

The increases noted in these six herds, samples of many others, afford wonderful encouragement to every dairyman. In four years the average addition to income has been the value of over 3,000 lbs. of milk and 109 lbs. fat, that is at least $35.00 per cow. Both small and large herds have gained: the first herd shows actually 93 per cent. more milk, many other dairymen are now aiming at nothing short of 10,000 lbs. milk per cow instead of the old contentment with 6,600.

So the wisest among our dairymen, our farmers of far sight, clear vision, and big ideals, take up cow testing and reap rich rewards.

Let me give you another definite case: in two years sixty patrons of two creameries who were keeping records made a gain of 71 lbs. fat per cow, or 8 per cent. The other patrons who were not cow testing fell off 87 lbs. fat per cow, or 17 per cent. Note what might have been: if all patrons had increased like the sixty did, there would have been an additional make last season of 58,300 lbs. butter. You know what butter is worth.

Fortunately our farmers are not touched alone by this purely monetary consideration. To the call of these awful times for men, they have responded magnificently. To turn now with broadening conceptions of responsibilities towards encouraging each cow to "do her bit" through true partnership is to be of timely, valuable service to the nation.

FARM MANAGEMENT.

A. Leitch, O.A.C., Guelph.

For Mr. Leitch's address see report of Eastern Ontario Dairymen's Association, page 13.

The following discussion followed this address:

Q.—You told us you had a herd of tuberculous cows in your stable, why do you keep them?

A.—They are good breeding animals and we have a method of pasteurizing the milk and we get the same price for the milk as we do for the other milk.

Q.—Do you think that is a safe thing to do?

A.—Yes, if the milk is pasteurized; if it is heated to a sufficient temperature to kill all the tubercular germs. In its raw state, as it comes from the cow, it is not safe. This herd is a very valuable one; they average over 14,000 pounds of milk a year; they are too valuable to slaughter.

Q.—If an ordinary farmer had that herd would he be allowed to keep them?

A.—He certainly would be allowed to keep them, but he could not sell his milk and it would not pay the ordinary farmer to go to the trouble that we go to to keep them isolated. They must be kept entirely separate from the rest of the herd.

Q.—Does not the tuberculosis affect the offspring?

A.—No, the calf is born healthy, and of course it is immediately removed and fed on milk from a healthy animal, and that calf is just as good as one from a healthy cow.

Q.—Are these cows getting better or worse?

A.—There is no positive test by which we can tell just what state the disease is in. Some of these cows have been in there seven years, and in spite of that fact, they are the highest producers we have. If these cows were put in a herd with 40 or 50 others, there is not one man is this audience who could pick out the tubercular animals. Of course when they get down in the last stages of the disease you can pick them out.

Q.—How long have these cows had this disease?

A.—Since 1909.

Q.—Do you think it is contagious?

A.—It is undoubtedly contagious, and if these cows were placed in a herd of healthy animals of 80 or 90 head, I guarantee that in two or three years half of them would be infected with tuberculosis.

Q.—What about the people who take care of this herd?

A.—We have had one man who has practically looked after the herd since they were isolated, and he is about the healthiest looking man we have. It has not been definitely decided by scientists whether the tuberculosis of the cow can be transmitted directly by contact to the human race. It is suspected that milk from tuberculous cows if fed to infants or even grown persons would transmit the disease.

Q.—Would you recommend seeding timothy and alsike along with clover?

A.—If you wanted the seeding for the next year I would use that pasture mixture like any other grain crop for feeding because you very seldom have a failure.

Q.—How long after you had sown that crop would you turn the cows in?

A.—It would depend on the weather, but the crop never should be allowed to come to a head. When it is six or seven inches high is the proper time to pasture

it. If you cut off any grain crop before it heads out it will start to grow again, but once it gets headed out it will never grow any more.

Q.—Would alfalfa do as well?

A.—We put two pounds of alfalfa seed in this permanent pasture mixture in 1915 along with the spring grain crop, and there was quite a lot of alfalfa there this spring. Whether it would be satisfactory to pasture the alfalfa I do not know; I never tried it.

Q.—I understood you to say that the milking machine was not as clean as hand milking?

A.—It is not as cleanly as the best hand milking.

Q.—Do you mean to infer that if they were both done under good conditions or under average conditions, the hand milking would be best.

A.—As far as you can tell with a sediment test or with a strainer or any mechanical examination, the machine appears cleaner, but if you make a bacteriological examination, it invariably shows that the hand milking is the cleaner. I think you would get cleaner looking milk from the machine than from the hand milking, but from the bacteriological standpoint, the milking machine, on account of the different parts of the machine with which the milk comes in contact being hard to clean, shows a high bacteriological count as compared with hand milking.

Q.—Would not that occur largely by reason of the solution the machine was kept in?

A.—Yes, but even under the best conditions, in the machine milking, take it day after day, the bacteriological count is higher than with hand milking.

Q.—I have heard inspectors claim that if all the milking was done by machinery the cheese would be of a lower character?

A.—He inferred that the machine milking was not as good as hand milking. When a machine is kept under the best conditions it is not as good as hand milking, and if the machine is not kept clean it is about the dirtiest thing you can possibly have. If it is not washed two or three times a week and kept in a proper antiseptic solution, you cannot have anything filthier than the milking machine for the production of milk. (Applause.)

THE DAIRY FARMER IN 1917.

Prof. H. H. Dean, Ontario Agricultural College, Guelph.

I would like to congratulate this town on the fact that they have decided to have one single organization for the distribution of milk, and when I read that in the papers, I said to myself, "That is a move in the right direction." It indicates that old Oxford has the right idea, and instead of having seven or eight or ten men travelling over the same street peddling milk, one man will do all this work and save a great deal of expense in delivery. That is in line with all modern improvement in the dairy business. We do not want half a dozen men doing the work that could be done by one man.

I would like to see the pasteurizing of milk insisted on, because we can never be sure whether our cows have tuberculosis or not. There is no way of telling except by applying the tuberculine test, and if milk contains tuberculine germs and you drink it or your children drink it, there is great danger from that worst scourge to the human race, tuberculosis. Therefore, the only safe method is to pasteurize

the milk, and I am glad to see a city of the size of Woodstock taking up this question and providing for safe milk.

I would like to suggest at this time, after fifty years of this Association's life, that the dairy farmer of Western Ontario should have a larger representation on the Board of Directors of the Western Ontario Dairymen's Association than they have had in the past. I believe right here in this locality I could name two or three men who would be ornaments on the Board of Directors of the Western Dairymen's Association. I believe the farmers will take a greater interest in the Western Dairymen's Association if they were more strongly represented on the Board of Directors. I understand there is only one farmer at the present time on the Board and he told me he felt lonesome on that Board. I can understand how he would feel with all these big cheese and butter manufacturers and cheese and butter buyers who are driving their automobiles and who throw on considerable style, and I have no doubt he really does feel lonely on that Board, and I would offer this suggestion, that the Board of Directors for the coming fifty years—that is a long way ahead—have a strong representation of dairy farmers. I believe it would add to the strength of the Board and the good work that can be done by this Association.

The dairy farmer of 1917 should aim to produce all the milk possible, for two reasons: There is a great shortage of milk the world over; and the price is likely to be the best on record. In support of this, allow me to quote from the 31st Report of the International Market of Milk and Milk Products for third quarter, 1916, which is published by the Swiss Agricultural Association, and based on reports from practically every dairy country of the world: "In all the more important centres of supply there have been complaints of a diminished production. To this decrease were added the great requirements of the armies, and the increasing demand, on the part of the civil population, for milk and milk products owing to the high prices of other necessaries of life. During the coming months a sharp drop in the milk supply will have to be reckoned with, more particularly in the European centres of supply. It may be forecasted with tolerable certainty that the supply of milk products will not be maintained at such a level as will even approximately suffice to satisfy the ever-increasing requirements. In most countries, therefore, further advances in the prices of milk and milk products are in prospect."

Looking at the question from a world viewpoint, there is an almost certainty for paying prices for milk and milk products during 1917, whether the war continues or closes suddenly. However, there is an element of danger in boosting prices too high for an essential food product. It tends to arouse the antagonism of consumers, who will try to boycott the food; and causes them to look for substitutes which are cheaper. This is an undesirable condition from a dairyman's point of view, as we desire to have the people consume dairy products in large quantities, believing that it is good for the dairy industry and also for the people who consume milk, butter and cheese. We favor maintaining the price of dairy products at a fair paying basis, avoiding extremes which are not good for either producer or consumer.

What dairy farmers need to do more than anything else in 1917 and after, is to find out what it costs to produce a quart or 100 lbs. of milk, a pound of butter or cheese, then after adding a fair margin for profit, they will be able to say our goods cost so much to produce, so much has been added for profit, the selling price is so much. This is the method in other lines of manufacture. Why not in dairying? There are many difficulties in the way of such a procedure, but it can be

done, and by co-operative effort farmers will be able to get "a square deal" in the marketing end of the business of farming. This does not mean combination in "restraint of trade," or for the purpose of "boom prices," but it is the only way to be assured of interest on the funds invested in farms and live stock, and fair pay for the labor of the farmer and his family.

Another common fallacy is the statement frequently made that because it takes more milk to make a pound of cheese or butter than it "used to," farmers are not making so much money as they once did. The old rule in cheese factory districts was "one-pound-for-ten," by which was meant, the cheese manufacturer agreed to make a pound of cheese for ten pounds of milk delivered, which, as a rule, he could not honestly do. However, that was the rule for a number of years. At the same time there was, and is yet, in some localities the "standard" rule. By a "standard" is meant 3,000 lbs. milk, which is based on the supposed average production of a cow for the cheese factory season. According to these two rules an average cow would produce 300 lbs. cheese during the season. There are no exact figures to guide us, but we are safe in assuming that the average cheese factory cow in Western Ontario is now producing 4,000 lbs. milk per season, or the "standard" has been raised 1,000 lbs. Even though it takes 11½ to 12 lbs. milk to make a pound of cheese in these modern times, these "average" cows are producing 348 to 333 lbs. cheese per cow as compared with the 300 lbs. cheese cow of the "good old days," which some people are sighing for, and also for the times when "It didn't take so much milk to make a pound of cheese as it does to-day." The question of legislation with reference to "imitation butter," or "oleo," as it is commonly called, should be carefully considered at the present time, when pressure is being brought to bear on the Federal authorities to allow "oleo" free entrance to the Canadian market. A leading American paper published in Chicago, the centre of the "oleo" trade in the United States, says that more imitation butter was made in that city during the months of October and November, 1916, than ever before in any two months. This looks as if the "oleo" manufacturers were preparing to not only supply large quantities of goods to home consumers, but also to flood the Canadian market with their imitation products. The high price of butter, in both Canada and the United States, is the immediate cause for the activity in "oleo" circles. Without going into details or a full argument of the merits and demerits of this competitor of pure butter, there are three good reasons for not admitting it to Canada:

1. Experience proves that it cannot be so regulated as to be sold for what it is, and not as butter, which is fraudulent to the consumer.

2. Every pound of oleo displaces a pound or more of good, pure butter, which is detrimental to the dairy farmer's business and to the creamery industry of Canada.

3. The source of "oleo" is uncertain. Canada stands for pure food. But allowing that the source and sanitary conditions in oleo manufacture are all that could be desired, this imitation butter lacks the "vital principle" found in butter, which is essential for the growth and maintenance of Canadians and of all peoples.

Another question which should receive careful attention from dairy farmers during 1917, more particularly in cream-producing sections, is the quality of cream which is sold. Cream grading is much talked of. As soon as conditions are favorable, that portion of the Dairy Standards Act relating to the grading of cream, will, no doubt, be enforced. Dairy farmers and others need to bear in mind that three things, chiefly affect the grade of cream: flavor and cleanliness, acidity, and percentage of fat. First grade cream should be sweet and clean in flavor, have an

acidity of not over .2 per cent. for "sweet," and not over .35, for churning, and test from 25 to 35 per cent. fat. In one of the monthly report sheets of a butter-maker applying for a Dairy School Diploma in 1916, the percentages of fat in the cream delivered during one month at his creamery varied from 9 to 52, which is a most unreasonable and unnecessary variation. Speed of the separator and percentage of fat in the milk are the two chief causes of variation in the percentage of fat in the cream.

Farmers who sell cream should clearly understand the difference between "fat" and "butter," and know what is meant by the term "over-run" and how these affect prices. A simple rule when calculating the butter equivalent of fat, as butter, is to add one-sixth or sixteen per cent. to the fat in milk, and one-fifth or twenty per cent. to the fat in cream. For example, if milk tests 3.5 per cent. fat, its butter equivalent or the pounds of butter per 100 lbs. of such milk is 3.5 + .58=4.08, or practically 4 lbs. In the case of cream testing 30 per cent. fat, 100 lbs. of such cream will make 30+6=36 lbs. of butter. If fat be worth 50c. per lb., butter at 42c. per lb. is the equivalent price and slightly more. In case the manufacturer takes the "-overrun," or excess of butter over fat for making the butter, he gets in the foregoing case 6 lbs. butter, which at 40c. per pound is $2.40, at 45c., $2.70, and at 50c. per lb., $3.00; that is, the farmer pays for manufacturing 30 lbs. fat, 8c., 9c., or 10c. per lb., according to the price of butter.

At the present high prices for cream, butter and cheese, dairy farmers may very well ask that manufacturers and buyers should not be allowed to take all the fractions of a pound as has been the custom in the past. When milk and its products were comparatively cheap it did not make so much difference, and farmers being of a generous nature, were willing to help the manufacturers and buyers by donating the fractions of a pound to help these struggling members of the dairy fraternity. But things have changed. Half a pound of cream, testing 30 per cent. fat, in seven deliveries, would equal a little over one pound of fat, which at present prices is worth 50 cents. Half a pound of butter on every box means 50 lbs. butter on 100 boxes, worth $20 to $25. Half a pound of cheese on every box means 50 lbs. cheese per 100 boxes, worth $10 to $12. We are not arguing for "close" weights, nor saying that there should be no allowance at all for "spills" and shrinkage, but there is a tendency to exact too much in these times of close figuring on profits and high prices for all kinds of food products.

Finally the dairy cow will help the farmer solve the labor problem by furnishing remunerative labor all the year round. On high priced land we can see no other solution of the labor difficulties on farms. The dairy cow, combined with hogs, is the only animal which can be profitably kept on land worth more than one hundred dollars per acre. A wise dairy farmer combines the minimum of human labor with the maximum of profitable machine labor, and works in co-partnership with the cow and his fellow dairymen.

These are some of the things dairy farmers should strive for in 1917.

Mr. John Scott: I would like to call attention to one suggestion Prof. Dean has made—that is that there should be a larger representation of the farmers on the Board of Directors. I do not think there is more than 10 per cent. of our membership composed of farmers; I am quite sure there is not 10 per cent. of the farmers on the membership roll. Each year we give a full session for the farmers and two for the manufacturers, and I would like to suggest that the farmers, as they go out from this session, join the Association.

Mr. Mahon, Woodstock: If it is in order, I would like to add a word or two

of commendation as to what Prof. Dean has said with respect to this organization. It has struck me for a number of years that it is too much in the hands of the cheese buyers and the cheesemakers. I have thought that in this day and age this great dairy industry should be represented more by the farmers. I have been impressed, in reading works published in the United States by the National Dairy Association, by the farmers that were represented, and I have thought that if we had a convention along that line, it would be a good thing for the cheesemaker and the creamery man. We ought to have this Convention held at a place where we could have dairy cattle on exhibition, and I believe it could be worked out. It might necessitate meeting in some one town in this Province yearly where proper buildings could be provided, but I would like to see some advance made along this line. This Association has done great work in the past, but I think it is time now to broaden out and put it on bigger lines and give it a wider scope.

Mr. J. N. Paget: Prof. Dean made two statements that might bear a wrong inference. I am perhaps one of the oldest directors of the Western Dairymen's Association of Ontario. I have been a director for twenty-five years, and during that time we have not had 10 per cent. of farmers on the membership of this Association. The farmers in the immediate neighborhood in which the Convention is held will attend, but we do not get 3 per cent. of the farmers to come a distance of 25 or 30 miles to attend the Convention.

The other question of which I think a wrong impression might be drawn was with regard to weights. I am not a buyer of cheese and butter; I am a manufacturer, and so far as the extra weight is concerned, I do not consider I have ever given away anything that rightfully belonged to the farmers. In cheese we allow half pound up weight. These cheese are made for the export trade, and that has been the great aim of the Dairymen's Association to educate our men to make export cheese. The market for that cheese is in the Old Land, and a cheese weighing only half a pound extra does not weigh its full weight when it reaches the Old Country market. If I put up a 45 or 50 pound box of butter in prints, if I only allow 45 or 50 pounds, what would happen when the retailer came to sell that butter out? If he did not give good weight to the purchaser, he would come back at the manufacturer; and so in order to give good weight we must give half an ounce on every pound of butter, which means a pound to the box. We have to give that in order to give proper weight, and I do not think there is anything wrong in regard to what we have been doing up to the present time in the matter of weights.

EVENING SESSION.

His Worship, W. S. West, Mayor of Woodstock, and Mr. Hobson, President of the Board of Trade of Woodstock, each in brief addresses, welcomed the delegates of the Association to Woodstock and expressed the wish that Oxford County, the leading dairy county of Western Ontario, would again have the pleasure of entertaining the members of the Western Ontario Dairymen's Association.

ADDRESS.

W. Bert Roadhouse, Deputy Minister of Agriculture of the Province of Ontario.

Let me first of all thank our worthy Chairman for his kindly expression of welcome to-night.

I would like, however, to express special pleasure at being permitted to be present at this particular year of the Association's history, the 50th Anniversary of this Association. Fifty years of service and usefulness have gone by since this Association was organized, and it seems to me only fitting that the fiftieth anniversary, the semi-centennial meeting of this Association should be held in this splendid County of Oxford, where the dairy industry found its birth in this official way, and where, I need hardly tell you, it has attained its greatest and highest development in the years that have intervened. It is fitting that you should come back again to this county at this time, and as a somewhat young man myself and having to pay the homage which youth owes to age, it is fitting that you should give to it that tribute of respect and reverence which its history and its achievement so rightly deserve.

It is not my purpose, however inviting the subject might be, to indulge in retrospect. We live in the present and for the future with our pathway illuminated by the deeds and the lives that have gone before. We live in the most momentous time of all ages, a time when even the work of those who remain at home is dignified, and I might almost say hallowed by the heroism and sacrifice of those who suffer and endure upon the far distant battle-fields in our behalf. It is but fitting, therefore, meeting as we do under these circumstances, that we should turn our minds for a few minutes to the problems which confront us in the present in order to make ready for the development of the future.

I understand that this has been one of the most prosperous years in the history of the dairy industry in this Province. With you I rejoice in that prosperity, not alone, however, because of its more material aspect. I covet for Ontario all those things which are described as the refinements of rural life, but I appreciate the fact that all this refinement must have an economic basis, and so I congratulate you upon that prosperity because I believe it means the accomplishment and makes possible the realization of better stock, better silos, better roads, better schools, more contributions to the Patriotic Fund, more accomplishment along all these lines which make for better communities and a stronger nation.

But I would not leave it there. It is said that because this prosperity is due to a certain extent upon the war, that we live in a fool's paradise, and that when conditions which have made this particular kind of prosperity possible have passed away, there will be a re-action and a different story to tell. It is true, as many of you may be aware, that during the past year Canada has shipped ten or twelve million pounds of butter to Great Britain, and to that splendid export trade, Ontario has made no small contribution. That is one of the outstanding facts which perhaps explains the prosperity, and also may have some bearing on the question of the high cost of living which we hear discussed so much to-day. Looking that fact in the face, we are bound to ask ourselves the question, "What is to become of this production when the war is over and the markets to which we have been sending this steady stream are again subject to readjustment?" This question affects us particularly in this Province. For many years past this Province has been sending the finished product of the farm, including the product of the creamery, to the Western Provinces, and some may think that when the stream of export to Great Britain has again subsided, we may resume the market which we had before the war. That is not entirely a sound conclusion, as is well known by those who are keeping in touch with the trend of the times, and have noticed the development along agricultural lines which has been taking place in the Western Provinces of Canada. I would bring to your attention this one significant fact, that on

October 24th, 1916, a carload of creamery butter was shipped from Regina, Saskatchewan, made up of the products of the three Western Prairie Provinces, to Manchester, England. That is a significant fact, because if I am rightly informed, that is the first carload of butter which the Western Provinces have shipped to Great Britain, and it, therefore, registers an epoch in their agricultural development. Its significance to us, however, is in the fact that there has taken place a development in the West which will enable the West to not only take care of its own needs, but also have something over and to spare for the export market. It is therefore incumbent upon us to look to the markets of Great Britain for future extension. When we take that point of view, we find that Great Britain imported before the war 75 per cent. of the butter which she consumed, and of that 75 per cent. imported, 61 per cent. came from sources outside the British Empire. That is a striking fact; it has been accounted for to some extent by geographical conditions. Denmark is famous for its dairy products, and has geographical advantages over the Province of Ontario, and in that way has contributed a great deal of that 61 per cent. of the imports of Great Britain from outside the Empire. It is not, however, too much of a presumption to think that possibly when the re-adjustment takes place, there will still be an opportunity for the marketing of the products of this country, and not of Ontario alone, but of all the Provinces of Canada. We in Ontario must look first of all to the development of our own Province, but we should look at it also from a national standpoint, and we must rejoice in the progress and welfare of the other Provinces, and I say under brighter conditions, can we not look to that market which will, for many years to come, still be an outlet for a considerable portion of our products? The essential thing, I take it, is to be able to export large quantitites of a uniform quality, and only when we are able to meet that condition will we be able to look forward with confidence to the development along that line.

That brings me to this question: Can the West beat the Province of Ontario in the manufacture of butter? I do not think so. I am aware that during the past two or three years at the Exhibition in Toronto, Ontario butter has not stood as high as we would like to have seen it. That may mean—no doubt does mean—that in that particular case, Ontario butter was not as good as its competitor, but I do not think that that conclusion can be fairly applied to the product of the Province of Ontario as a whole. It simply amounts to this, that Ontario in the development of her industry from its pioneer days of 50 years ago has developed along lines suitable to her own local trade. The Western Provinces, however, coming in at a later date with new conditions and proper supervision, have developed on a basis suitable to the export trade, and that is a condition which we must study and which we must recognize, and if we are to look forward to the development along lines which I have indicated, I submit that we will have to do more than we have been doing in the past in the way of grading cream, in the first place, and grading butter in the second place, in order to realize the ideal of a large quantity of uniform quality. That is the problem before us at this particular point. In the working out of that problem, a responsibility rests upon the Ontario Department of Agriculture, and the Department is anxious to do what it can to work in co-operation with the producers, and in co-operation with the makers, and in co-operation with those who have the marketing end in hand, to accomplish the ideal which I have outlined.

I trust the deliberations of this important gathering which carries such great weight and has such influence, will bring nearer the day when we can look forward to

the realization of this particular ideal. Man does not live by butter alone, although if all we hear now a days is true, there are a great many people in Germany at the present time who would like to have a little more of that particular commodity than they have. However well we look forward to the future and make our plans in the future, let us not forget that the first and most important problem before us is the winning of the war, and anything we can do which will contribute to that should be done. In the agricultural industry we are in this happy position, that very often in planning for permanent development we are taking the shortest steps for the aiding of the winning of the war and the accomplishment of the ideals for which it is being waged.

We are told that there are three things necessary in the winning of the war: men, munitions and foodstuffs, and it may be interesting for a moment or two to contrast the methods which have been adopted in working out these three distinct lines of war activity. In the raising of the army in the first place, you are all familiar with the procedure. The Government takes hold and calls for recruits, and in Great Britain we have seen an army of one hundred thousand raised to an army of five million in less than two years. Similar illustrations might be drawn proportionately in Canada. In the matter of munitions, the Government in Great Britain likewise took hold of this matter, and in many cases took hold of factories, organizing them along the lines of production that was necessary, and to-day we have four thousand factories in Great Britain manufacturing shells, ninety-five per cent. of which never manufactured a shell before. We find also ninety arsenals manufacturing big guns where there were only eleven before the war. We find four million people employed in these activities, where only a few thousand were employed before the war, and this is largely through direct Government control and organization. No so, however, when we come to the other aspect of the problem, the production and transportation of food-stuffs. That is an aspect which, as far as I have been able to learn, no Government has undertaken the responsibility of operating. That has to a very large extent been left in the same channels as before the war. By that I mean it has been recognized that the man who is on the land, who controls the land, and who owns the implements and has had experience to carry on the duties of developing and making available quantities of food stuffs has been left to work out the problem. The Government has laid before the people who owned the land and who owned the implements, the information as to the need, and they have relied upon their patriotism, plus the economic return, for accomplishing results which are so important to nations as well as individuals. There have been, however, certain steps taken in other lines in order to stimulate that production. In England, the Government has appointed local committees in the different districts throughout the country to co-operate with the farmers in production and in procuring seed and fertilizers, in conserving live-stock and also in extending the area of operation as far as possible. As many of you are aware, England has vast areas of undeveloped land. About ten years ago it was my privilege while in England to hear the late Henry Campbell-Bannerman, then Prime Minister of Great Britain, deliver an address in which he proclaimed the ideal that he desired, that the land of England should be more a treasure house for the poor than a pleasure ground for the rich. That phrase clung to my mind and impressed me. While that was a plank in the Government platform at that time, little was accomplished until the grim necessity of war forced upon the people conditions with which they were not confronted before, and matters which they could not fully realize without that grim necessity; and now there

has been a greater effort than ever before to reclaim and turn under the plough large areas which in the past have been used largely for pleasure purposes. In this way England has endeavored to increase her supplies of food stuffs and the matter of labour has been a considerable problem. There have been brought into use over fifty thousand women workers on the land. On the other hand, there have been taken away over three hundred and fifty thousand men. England is putting forth every effort to increase and maintain the essential food stuffs for the maintenance of her people.

Then let us turn just for a moment or two to France. I am glad to note the arrival of Mr. Rowell, who during the past summer visited France, and will no doubt be able from his personal experience and observation to give you information as to how they are endeavouring to deal with these problems under the immediate shadow of this great conflict. A great deal has been accomplished by France in the maintenance of her agricultural production. We are told that old men and women and children have been greatly supplemented by military organizations, and even right up to the trenches the work of cultivation has gone on. One case which directed my notice in reading of this was that of a section of a battalion, which with the expenditure of $50 for seed and implements, had secured a return of $600 in vegetables and other products. So much encouraged have they been by that success, that this year they are going into raising poultry and pigs, and if the war continues much longer, I fancy they will soon be in the dairy business as well. They have their own organization, and certain men are detailed to this duty, and the cultivation goes on right up to the trenches in the sections which have been evacuated by the population, as well as farther back where the population still carry on, as far as possible, their vocation of peaceful days. It is interesting to see how much has been accomplished in this way and how far organization can go to realize these results. They are going further this year than in the past, and a law has recently been passed empowering the Mayor and Councils of Municipalities to see to it that every piece of vacant land is cultivated and utilized to the fullest possible extent. The Mayor is clothed with authority to take over any land which the owner is unable or unwilling to cultivate. It is not anticipated that there will be many who are unwilling but there will probably be many who are unable, and so it becomes the duty of the municipality to take over these areas and get machinery and cultivate the land and produce the crops which are essential for the maintenance of the population. Measures are also taken to conserve live-stock and to prevent the slaughter of breeding stock, to supply machinery where needed and in some cases to advance capital to the peasants where the lack of such capital is handicapping the fullest accomplishment of their agricultural production.

All these things are interesting to us in this land. Although we cannot forget that there is a wide difference between their circumstances and ours. In this favoured land we are concerned largely with the question of how much surplus we can export. In England, before the war they imported 56 per cent. of the foodstuffs consumed in the British Isles, and in France they imported a much smaller percentage, so you see the production of foodstuffs is a very essential matter to these countries, and next to catering to our own supply, it is important that we should put forth every effort in our power to produce as much as possible that we may send forward as much as possible to those who need it so badly. We must study and look at the measures which have been taken, and take into consideration the circumstances, and we can agree on this great truth that in war time the man who owns or controls land is acting in the truest and most real sense as a trustee

for the nation, and he owes it to the nation as well as to himself to see that every foot of land which he owns or controls is made to produce the maximum under the circumstances he finds himself in. I realize there are many difficulties in the way, but our difficulties are not to be compared to the Old World difficulties to which I have referred.

I leave with you simply this one great truth that the ownership of land in war time is a trusteeship for the nation, and a realization of that truth will be an incentive to every one who has it in his power to do his best, whether it be by better seed, better stock, better methods, or by whatever means his particular circumstances make possible. He should do everything in his power to see that he gives a good account of his stewardship, and that in this relationship he is able to render a service as he goes along, so as to make the nation stronger in the days that are to come.

ADDRESS.

N. W. Rowell, K.C., M.L.A., Toronto.

I am very glad to have this opportunity of meeting with the members of the Western Ontario Dairymen's Association, and as the member for this riding to join in the welcome which has already been extended to you on behalf of the city of Woodstock. I am sure you could not have chosen a more appropriate place for your meeting, for have you not come to the centre of the dairy industry when you come to Oxford County, and if the people of Ingersoll will pardon us, to the important part of Oxford County when you come to the city of Woodstock.

May I congratulate you on the work of your Association. As one engaged in devoting some time to matters affecting the public interest of our country, one must recognize the increased value of work of Associations such as yours; particularly the work you do in improving the quality of the product and increasing the output of the Dairy industry in our part of the Province. Those who are engaged in that work are rendering real national service, not only at this time but at all times, for just to the extent to which you improve the quality and increase the output, are you enriching the nation and enabling it to carry its burden and discharge its responsibility, as well as providing an increase and more food stuffs for the people, and never in our history, as Mr. Roadhouse has already pointed out, was the question of food supply so important as at the present time.

It seems almost incredible that over in the Motherland they are not restricting the amount of food which each individual is entitled to eat, and yet the food supply is becoming so important over there that they have had to appoint a Food Director, and the Government is taking measures to secure a more equitable distribution of food among the people, and measures to limit the consumption. In the first address made by the Food Comptroller, Lord Devonport, in the House of Lords, he made this important statement: his first duty would be to ascertain the quantity of foodstuffs available and stocks visible. There were many unpatriotic people, he said, trying to get hold of supplies in excess of their wants, and he will so adjust the supplies coming into the country that everybody will have an equal chance to get a fair share, no more and no less.

We are living away from the scene of action, and do not even know the hardships incidental to living in a country at war. Baron Devonport added that the

general diminution in the consumption of staple food was necessary. At the present time this diminution can be brought about only by voluntary abstinence, but if voluntary abstinence is not sufficient it would be necessary to make abstinence compulsory. I only give you that official statement by the new Food Comptroller to bring before your minds how important the question of food supply is in the Mother Country at the present time.

It is still more important in France and Switzerland, and very much more important in Germany and Austria. This war has emphasized more than anything else in modern times how fundamental agriculture and the production of food is to the very life of the nation. Unless the farmer and the breeder are producing the nation starves, and defeat stares the nation in the face that has not an adequate supply of food. When Germany years ago considered her position and the prospects of the war to which her soldiers looked forward in the future, she saw that agriculture would be fundamental in that struggle, and not only from the standpoint of national prosperity but as a matter of military necessity, Germany more than twenty years ago undertook large schemes of co-operation between the Government and the agricultural interests of Germany so as to gradually increase the output of the nation. They only have a limited territory. The Province of Ontario is very much larger than the whole German Empire. They have seventy million people to feed within their own country, and if Germany had been engaged in a war, with her seventy millions of people and with her food production of twenty years ago, Germany would have been starved out in the first year of the war. It has only been possible for Germany to continue warring up to this time because of the radical measures she took and has taken during the past twenty years to increase her agricultural production.

While I was in England a report was prepared by the British Department of Agriculture, and has since been published, in which it is pointed out that if the production per acre in Germany of food products was not greater than the production in Great Britain, Germany would have been starved out before this. It was by the marvelous increase in production by intensive cultivation that Germany was able to so wonderfully increase her agricultural output from the area in which she had been receiving a smaller output some few years ago. She did it by developing the agricultural education, by the developing of co-operation in farm finance, by sowing improved grain, by improving her type of stock, and by the very large use of artificial fertilizers. One of the troubles of Germany to-day, owing to the stiffness of the blockade, is that she is only able to get in very little food supply, but owing to the system of improved agriculture which she had developed in her territory, given normal conditions, she will produce almost enough to feed her people under a rationing system, but her trouble to-day is she cannot get the fertilizers necessary to fertilize the soil in order to get the results which she has been getting in the past, and because of her inability to get fertilizers, she is not able to get the food supply which she has been accustomed to in recent years.

In Great Britain, they are now taking radical measures in order to meet the situation which faces them. Do we realize the fact that last year there was a shortage of approximately 25 per cent. of the wheat crop on the Northern Hemisphere? Taking all the countries together, the wheat production was 25 per cent. less than the preceding year, and if you take the Southern Hemisphere, it does not materially improve the situation; and while the very large crop of the previous year will help out the situation, yet it is recognized that the coming year is going to be one

of the most critical in the history of England, as well as other countries in Europe, and in Great Britain they are adopting the measures which Mr. Roadhouse has so clearly pointed out.

Let me draw your attention to one other fact. On one hand, Great Britain's blockade of Germany is to prevent her from getting in the necessary supply to continue the prosecution of the war, and on the the other hand, Germany's submarine policy is for the purpose of crippling Great Britain's merchant marine, so that Great Britain cannot get in the food supply and the munitions which she has been in the habit of drawing during the past 2½ years from the United States and other neutral countries, as well as from Canada and other British Dominions. By the continued pressure which the submarine warfare has exerted upon the British and neutral ships, they have certainly embarrassed Great Britain in the matter of getting in the necessary supply; 60 per cent. at least of the mercantile shipping of Great Britain is now required for military purposes for transport in connection with her army and navy, and when you take from the remaining 40 per cent., the losses due to submarines, you will see what an important diminution there has been in British shipping and in her capacity to transport food and other necessary supplies.

I mention these things so that we may get in our mind's eye, if possible, something of the situation in the Motherland at the present time. There is not only this situation so far as food is concerned, but there is also the situation so far as finance is concerned. Financially Great Britain is not only carrying the enormous financial burden of supporting her own army and providing them with the necesssary munitions and maintaining her navy, but she is largely financing her allies. Great Britain to-day is financing the foreign purchases of her allies. Great Britain has largely been financing the purchases in the Dominion. Happily we in Canada have passed from that stage, and we are more than paying our way so far as Great Britain is concerned, but what does it mean for the supplies purchased in the United States for Russia, for Italy and for France? Great Britain has not only to provide the money to pay for the purchases, but she has to borrow money to pay for these purchases, and to put up her own collateral to do it, with the result that by the 1st of August next, if the war continues that long, and there is every prospect that it will have to go on for a much longer time, Great Britain will have such a national debt that the annual interest charge at 5 per cent.—and the interest charge will be more than 5 per cent.—the annual interest charge at 5 per cent. will be £200,000,000 per year. Her annual interest charge by next August, growing out of this war, will be equal to the entire national income of Great Britain before the war. Take the income of Great Britain from all sources of taxation before the war and her interest on the debt incurred in the war will equal that. This year, Great Britain will raise from taxation on her own people £300,000,000 more than she raised the year before the war broke out. She raised £200,000,000 by way of taxation before the war broke out, and this year she will raise £500,000,000. Add to that 50 per cent. as compared with the taxation before, and notwithstanding all that taxation, she has incurred that enormous public debt. She can only go on purchasing in neutral countries food and munitions so long as she is able to pay in gold or able to get credit, and if the time should come that Great Britain could not pay in gold, or could not get credit in neutral markets, that time she must cease purchasing, and at that time, if her enemy was still strong and powerful, she would be unable to continue the struggle unless within ourselves or within our Dominions, she could get the necessary supplies to carry on the

war. This is no fanciful picture. It is a matter of grave concern to the public men of Great Britain at the present time.

What happened in the United States recently? Great Britain and France expected to place upon the American market short date treasury bills, as they called them, and raise a large sum of money to help pay for the supplies being purchased in the United States. The American Central Reserve Board issued a statement discouraging the purchase of these foreign short date securities by the American people. What was the immediate effect of that statement? The immediate effect was that Great Britain and France had to withdraw from the market, or did withdraw from the American market these securities, and to that extent their credit was diminished in the American market. How long they will be able to maintain their credit in the American market, I cannot say, but they have got to put up collateral in the shape of American securities and other securities which were held by the British people. People that have stocks or bonds have been called upon to deposit them with the Government, and the Government deposited them as collateral security. There is not an unlimited reservoir of that kind, and to that extent the British credit has been diminished.

Why do I emphasize this? For this reason: there will be greater demands this year that the Dominion should supply Great Britain with the things which she absolutely needs to continue this struggle—greater demands than there has ever been in her history. She will need more food from Canada than she has ever needed before. She will need more munitions from Canada than she has ever had before, and other things essential to her success in this struggle, and if there is one word I can say to the agricultural interests of this Province to-night, it is this, *Produce, Produce, Produce.* Every additional pound of food produced in this country increases our chance of victory, and every patriotic citizen to the full measure of his ability, whether it be on a garden plot or on 100 or 200 acres of land, should to the full limit of his capacity see that every ounce of food is produced.

We have an unique situation, particularly in the agricultural possibilities of this Province to render greater assistance to the Mother Country at this critical time, and the man who leaves land idle which might be cultivated and which might produce, is to that extent, diminishing Great Britain's capacity to win this war, diminishing our capacity to win this war, for this is our war just as much as Great Britain's. I know the answers that will be made about the difficulties of labor, and I admit the difficulties are great, and I am sure every possible assistance that the Government organizations can give the agricultural interests should be given to assist in the question of labor. I am not now suggesting that we should follow the example of France or Great Britain, but let me tell you what France has done. I was in France this summer in the midst of harvesting, and there was not a young man or man of mature age to be seen anywhere as I travelled across France. When the war broke out in August, 1914, the Minister of Agriculture of France issued an appeal to the women of France. He said: "The men of France have been called to the colors to fight for the defence of your homes and your liberty, will not you, the women of France, gather the harvests and prepare the ground for the next season's crop so that your husbands and fathers and brothers when they return will find that their homes and farms have not been neglected?" At that time they thought the war would be over in the autumn and late fall of 1914, and the women of France gathered the harvest of 1914 and prepared the fields for the spring crop of 1915. They sowed the crop of 1915 and they gathered the harvest of 1915, and they prepared the ground for 1916 and sowed the crop of 1916, and were gather-

ing the harvest of 1916 when I was there, and no doubt they have prepared the ground this fall, with the assistance of old men and boys, for the crops of next year. It is owing to the sacrifices and the service of the women of France, that France is able to be fed during this crisis.

When I was in England I know the wives and daughters of Cabinet Ministers, women from all ranks of society, were going out into the fields helping to gather in the harvest because men were not to be had, they were at the front. If not at the front, they were engaged in the manufacture of munitions or other useful things. We have not commenced to feel the burden of this war like the people of the Mother Land, except those who have relatives at the front.

We all know the financial condition of this country at the time war broke out; we would not have been in as good a financial position were it not for the war.

Do you mean to tell me that the people of our Empire can go through this Gethsemane of suffering and that many can sleep on and sleep on while others are suffering and sweating great drops of blood to pay for us, our homes and our liberty?

We must all awake to the magnitude of the crisis we are facing, and each in his place, every man and every woman, put forth every ounce of energy to help those who are struggling and dying for our defence.

I said this was Canada's war. We have by voluntary action of our Federal Parliament, concurred in by all the members representing all shades of politics, joined in sending our troops to make war on the most powerful military nation of modern times. We cannot make war on Germany on any limited liability principle. Poor defenceless Belgium knows what it means to even deny Germany the right to cross her territory to attack her friends. Serbia and Roumania know what it means to make war on Germany. But for that wall of steel which our gallant men and the men of Britain and France have built up along the western front, and but for His Majesty's navy, we in Canada would have known before this what making war on Germany means. We have committed ourselves deliberately to this great enterprize—I believe rightly committed ourselves. I believe we had no alternative in honor and in duty and we must be prepared to see it through. Great Britain thought that by sending 150,000 men to the aid of France and Russia, plus the British navy, with such financial assistance as she might give, they could handle the situation. But Britain soon found that she could not carry on war on the limited liability principle, and she has raised over four and a half million men. The struggle is waged on more than two thousand miles of front to-night and forty million men are engaged, and this is the critical hour of our history. If you forget everything else I have said let me come back again to this *Produce, Produce, Produce!* Let next year, under Providence, mark the greatest production of food products of this Province.

The Government has announced a campaign of thrift and economy. Some people think the farmers are economical enough already. But there is no doubt that every dollar we can properly save will help win the war. Great Britain will spend during this year hundreds of millions of dollars in this country, we can take care of the payment by thrift and economy. We have not commenced to save in this country as yet. In England they are not getting new suits of clothes and new dresses. They haven't been having their lawns cut and they have not been having their flower beds attended to because the men are required for other work. I believe the people of this country are prepared to do everything that is necessary if the Government will only lead ahead and set them an example. We should not only do this for the reasons that I have mentioned, but we should do it for the

sake of our own gallant men who have gone to the front and who have given their lives in this great struggle. At no time last summer did they have sufficient reinforcements in England to provide the necessary reinforcements at the front. The Fourth Division had to be broken up to provide reinforcements, and some of our regiments had to fight when only six and eight hundred strong and do the work of one thousand men. They had to do that because there were not sufficient reinforcements to meet the situation. When the Fourth Division went over in August, our gallant First Division was then expected to have a period of rest, but they found their rest in a march down to the Somme, and in that infernal conflict thousands of the men that marched down there laid down their lives for our liberty, and they got their rest under the soil of France. That is where our First Division got its rest, and the men of that Division are sleeping their last sleep by the hundreds under the soil of France. We have plenty of troops now in England to provide reinforcements for some months to come, and the situation I have mentioned will not occur again for some few months, but unless we secure the necessary reinforcements in Canada to provide for the wastage during this coming summer, we will face that same situation again next fall. That is not right—it is not fair. We have asked these men to go to the front for the defence of Canada, and we should stand by them, and I believe we will because I believe the hearts of the people will respond to the needs of the hour and every man and woman in their places we will all do our duty.

THE CHAIRMAN: There is not a man or woman in the hall to-night whose very being has not been stirred by the magnificent addresses that we have listened to. I do not think I have ever listened to such an address as has been given by Mr. Rowell. There is no man or woman here to-night that can gainsay one word he has said. We must receive his message as being the truth, and it ought to be taken very seriously by every man here. I have not one word to say against the agricultural class because I believe they are the backbone of the country. But I do believe, and I believe more firmly to-night than ever, that we are not doing all we could do. We have not begun to do yet what perhaps we will be compelled to do. I trust the words Mr. Rowell has uttered will sink deep into the hearts of every man present and that you will leave this hall with a determination to do your very best for our beloved country.

1917 LIST OF PRIZE WINNERS, WOODSTOCK DAIRY EXHIBITION.

Section 1, September White Cheese.

	Score		Score
1. Jos. Skelton, Thorndale	96.99	5. H. E. Donnelly, Straffordville (won on flavor)	96.33
2. C. J. Donnelly, Scottsville. } Tie	96.66	6. L. H. Schneider, Gads Hill.....	96.33
3. Jno. Cuthbertson, Stratford } Tie	96.66	7. Peter Callan, Woodstock (won on flavor)	96.16
4. Harold Hammond, Moorefield (won on flavor)	96.33		

Section 2, September Colored Cheese.

	Score		Score
1. H. W. Hamilton, Thedford.....	96.83	4. Wm. Lanyon, Aylmer	96.16
2. L. H. Schneider, Gads Hill....	96.33	5. W. J. Jamieson, Dorchester....	96.15
3. C. J. Donnelly, Scottsville (won on flavor)	96.16	6. H. Youn, Listowel	96.
		7. B. A. Holland, Verschoyle.....	95.99

Section 1, October White Cheese.

	Score		Score
1. Peter Callan, Woodstock	96.83	4. W. J. Jamieson, Dorchester (Won on flavor)	96.66
2. W. C. Loughin, Thamesford (Won on flavor)	96.66	5. Jno. Cuthbertson, Stratford....	96.66
3. H. Hammon, Morefield (Won on flavor)	96.66	6. H. W. Hamilton, Thedford. } Tie 7. E. M. Johnston, Innerkip.. }	96.49 96.49

Section 2, October Colored Cheese.

	Score		Score
1. Peter Callan, Woodstock	96.00	4. Wm. Morse, Trowbridge. } Tie	95.49
2. E. M. Johnston, Innerkip	95.99	5. W. E. Brown, Brussels... }	95.49
3. C. J. Donnelly, Scottsville	95.83	6. H. Youn, Listowel	95.16
		7. F. C. Eastman, Arkona.....	95.08

Section 1, 56-lb. box Winter Creamery Butter.

	Score		Score
1. R. A. Dennis, Strathroy	96.50	5. E. M. Johnston, Innerkip	94.82
2. Jno. Cuthbertson, Stratford	96.49	6. Treleaven & Panton, Palmerston	94.49
3. D. Doan, Southwold Station....	96.16	7. W. J. Neeb, Tavistock	94.33
4. Geo. W. Phillips, Seaforth	95.32		

Section 2, Twenty 1-lb. Creamery Prints.

	Score		Score
1. R. A. Dennis, Strathroy	95.99	5. H. A. Clark, Warwick..... } Tie	94.49
2. Geo. W. Phillips, Seaforth	95.15	6. Jno. Cuthbertson, Stratford }	94.49
3. E. M. Johnston, Innerkip.....	94.83	7. W. R. Pollock, Kerrwood	94.32
4. D. Doan, Southwold Station ..	94.66		

Section 1, 56-lb. box October Creamery Butter.

	Score		Score
1. W. R. Pollock, Kerrwood	95.65	5. C. A. Davies, London	93.65
2. H. A. Clark, Warwick	94.65	6. Treleaven & Panton, Palmerston	93.28
3. W. B. Dinwoodie, Belmont.....	94.15	7. D. Doan, Southwold Station...	93.07
4. J. E. Wilson, Forest	93.82		

Section 1, Three Canadian Stilton Cheese.

	Score		Score
1. H. Hammond, Moorefield	96.82	4. Garnet Bain, Lakeside (won on flavor)	96.16
2. Peter Callan, Woodstock	96.50	5. H. E. Donnelly, Straffordville..	96.16
3. H. Youn, Listowel	96.49		

Section 2, Two Canadian Flat Cheese.

	Score		Score
1. E. M. Johnston, Innerkip	96.99	4. Wm. Lanyon, Aylmer	96.48
2. W. E. Brown, Brussels	96.50	5. Wm. Morse, Trowbridge	96.33
3. Garnet Bain, Lakeside	96.49		

SPECIAL PRIZES.

By the Heller & Merz Co., 22 Cliff Street, New York—C. Richardson & Co., St. Mary's, Ont., Canadian Agents for Alderney Butter Color: $10.00 in cash—To the Buttermaker securing the highest score on butter exhibited in Class III., colored with Alderney Butter Color.—Jno. Cuthbertson, Stratford.

$5.00 in cash—To the Buttermaker securing the second highest score on butter exhibited in Class III., colored with Alderney Butter Color.—D. Doan, Southwold Station.

By C. Richardson & Co., St. Mary's: $10.00 in cash—To the Buttermaker securing the highest score on butter exhibited in Class IV., colored with Alderney Butter Color.—R. W. Pollock, Kerrwood.

$5.00 in cash: To the Buttermaker securing the second highest score on butter exhibited in Class IV., colored with Alderney Butter Color.—H. A. Clark, Warwick.

By the R. M. Ballantyne, Limited, Stratford, Ont., for D. H. Burrell & Co., Little Falls, N.Y., manufacturers of Chr. Hansen's Rennet Extract and Color: One four-bottle facile Babcock Milk Tester—To the Cheesemaker securing the highest score on September White Cheese, Class I., Section 1.—Jos. Skelton, Thorndale.

One case of Hansen's Cheese Color—To the Cheesemaker securing the highest score on October Colored Cheese, Class II., Section 2.—Peter Callan, Woodstock.

By C. H. Slawson & Co., Ingersoll, for D. H. Burrell & Co., Little Falls, N.Y., manufacturers of Chr. Hansen's Rennet Extract and Color: One case of Hansen's Cheese Color—To the Cheesemaker securing the highest score on September Colored Cheese, Class I., Section 2.—L. H. Schneider, Gads Hill.

One Four-bottle Facile Babcock Milk Tester—To the Cheesemaker securing the highest score on October White Cheese, Class II., Section 1.—Peter Callan, Woodstock.

By the J. B. Ford Co., Wyandotte, Mich., manufacturers of Wyandotte Dairymen's Cleaner and Cleanser: One finest quality Gentlemen's Silk Umbrella—To the Cheesemaker who is a regular and exclusive user of Wyandotte Dairymen's Cleaner and Cleanser, having the best finished and most stylish looking cheese on exhibition.—C. J. Donnelly, Scottsville.

One finest quality Gentleman's Silk Umbrella—To the Buttermaker who is a regular and exclusive user of Wyandotte Dairymen's Cleaner and Cleanser, having the neatest and most attractive exhibit of butter.—W. B. Dinwoodie, Belmont.

Note.—All exhibits (except Stilton and flat Cheese) are eligible for these two special prizes.

By the Canadian Salt Co., Windsor, Ont., E. G. Henderson, Manager: $25.00 in cash —To the Cheesemakers securing the highest scores on cheese (except flats and Stiltons) exhibited in any class. To be divided as follows: 1st, $10; 2nd, $8; 3rd, $7.—1st—Jos. Skelton, Thorndale; Tie for 2nd—H. W. Hamilton, Stratford; P. Callan, Woodstock.

$25.00 in cash—To the Buttermakers securing the highest score on butter exhibited in any class. To be divided as follows: 1st, $10; 2nd, $8; 3rd, $7.—1—R. A. Dennis, Strathroy; 2—Jno. Cuthbertson, Stratford; 3—D. Doan, Southwold Station.

By the Western Salt Co., Courtright, Ont., N. A. Leach, Manager: One barrel Purity Cheese Salt—To the Cheesemaker securing the highest score on September White Cheese, Class I., Section 1.—Jos. Skelton, Thorndale.

One barrel Purity Cheese Salt—To the Cheesemaker securing the highest score on October Colored Cheese, Class II., Section 2.—P. Callan, Woodstock.

One barrel Purity Dairy Salt—To the Buttermaker securing the highest score on fifty-six-pound box Creamery Butter, Class III. or IV., Section 1.—R. A. Dennis, Strathroy.

One barrel Purity Dairy Salt—To the Buttermaker securing the highest score on twenty one-pound Creamery Prints, Class III., Section 2.—R. A. Dennis, Strathroy.

Note.—No special butter or cheese required.

By the DeLaval Dairy Supply Company, Limited, Peterborough, Canada: A Silver Cup—To the Buttermaker securing the highest score on butter made during the month of October from collected cream, Class IV., Section 1.—W. R. Pollock, Kerrwood.

Note.—No special butter required.

By the W. A. Drummond & Co., Toronto: $10.00 in cash—To the Buttermaker securing the highest score on 56-lb. box Butter made from collected cream pasteurized and properly ripened, Class III., Section 1, or Class IV., Section 1.—W. R. Pollock, Kerrwood.

Note.—No special butter required.

By the Imperial Bank of Canada: A Silver Cup—To become the property of the Cheesemaker securing the highest total score, three times, or twice in succession, on two cheese; one cheese either white or colored, exhibited in Class I., and one cheese either white or colored, exhibited in Class II. In awarding this cup the scores of the two cheese securing the highest score in Classes I. and II. (belonging to the same exhibitor) will be added. In case of a tie, settlement is to be left with the judges. Won in 1910 by J. E. Stedelbauer; won in 1911 by R. A. Thompson; won in 1912 by D. Menzies;; won in 1913 by R. E. Hastings; won in 1914 by Mrs. O. Cuckow; won in 1915 by J. K. Brown; won in 1916 by P. Callan.—H. W. Hamilton, Thedford, Ont.

Note.—No special cheese required.

By the Toronto Produce Exchange: A Silver Cup—To become the property of the exhibitor of butter (except 1-lb. prints) at the Winter Dairy Exhibition who shall receive the highest score three times or twice in succession.—R. A. Dennis, Strathroy.

***Note.*—Cheese without a bandage shall be considered unfinished, and shall be scored off for finish accordingly.**
Cheese on exhibition may be paraffined.
All one-pound print butter on exhibition must be wrapped in plain wrappers.
All October butter must be sent to London Cold Storage by November 11th.

REPORT OF CHIEF DAIRY INSTRUCTOR AND SANITARY INSPECTOR, 1916.

FRANK HERNS, LONDON.

I beg to submit my Tenth Annual Report. Very little change was made in the work of dairy instruction from that of previous years. The usual Short Course held in April at the O.A.C. was attended by the instructors and much appreciated.

CHEESE INSTRUCTION REPORT.

CHEESE FACTORIES.—One hundred and fifty cheese factories received 354 full day visits and 488 call visits by the 5 cheese instructors.

MILK SUPPLY.—Eleven thousand six hundred and eighty-five patrons (573 more than 1915) supplied milk to the cheese factories. The estimated average per cent. fat in the milk for the season was 3.37, (slightly less than 1915). The average per cent. loss of fat in the whey was twenty-three one hundredths. One hundred and forty-nine patrons were visited.

QUANTITY OF CHEESE.—The output of cheese for 1915 amounted to 32,149,561 pounds, which is 11,140,496 pounds more than in 1914.

AVERAGE YIELD AND PRICE.—The average pounds of milk required to make one pound of cheese in 1915 was 11.06. The average price per pound of cheese was fifteen and eighteen one-hundredths cents. This is five one-hundredths less pounds of milk required to make one pound of cheese and one and sixty eight one-hundredths cents greater average price than in 1914. The prices realized in 1916 are the highest on record and will average approximately 18 cents per pound.

QUALITY OF CHEESE.—The cheese up to the end of June was very fine. During July and part of August there were times when it was very hard in some cases, chiefly owing to the extreme warm weather, to keep up the quality. In addition to these difficulties a temporary shortage of cheese boxes developed in one section, making it necessary to hold cheese for a considerable time in curing rooms, many of which are not properly constructed to keep the temperature at a point where injury to the flavor and texture of the cheese does not result. Fortunately there was an advancing market which prevented, to some extent, actual loss, but the quality and yield suffered materially under these conditions.

There were several other problems to contend with, among others, the decreased rennet supply. Western Ontario was, however, in a more favorable position on this point than were some sections of the Province.

The fall cheese were fine, and taking everything into consideration the quality for the season was maintained remarkably well.

There is every probability that the box problem will, by next season, be solved so far as quantity is concerned and substitutes for rennet will be placed on the market, thus relieving anxiety on this point. We wish, however, to point out the necessity for cheesemakers to exercise every precaution in purchasing unknown brands of rennet or rennet substitutes. The Federal and Provincial Dairy Departments have done and will do everything possible to determine by repeated experiment the usefulness of these substitutes. Pure commercial rennet used in proper proportions will, no doubt, give the best satisfaction, but indications point to a decreased rennet supply and substitutes will have to be resorted to more extensively than was the case last year.

Owing to the advance in cost of factory supplies, many cheesemakers who attempted to manufacture cheese at former prevailing prices, found it could be done only at a loss and to their credit the patrons came forward and readily agreed to bear part of the increased expenditure. A readjustment of manufacturing charges appears to be necessary to meet the changed conditions.

Milk Sediment Test.—Seven thousand four hundred and fifty-six sediment tests were made. Approximately 48 per cent. of the samples indicated too much sediment.

A card similar to the copy shown on page 107 was used, on which the "disc," showing the amount of sediment in the milk sent by each patron was placed and mailed when necessary. The results are encouraging.

Ice Cool Curing Room.—Sixteen factories have ice cool curing rooms.

Whey Butter.—Three factories made whey butter.

Pasteurizing the Whey.—Seventy-two factories pasteurized the whey and six factories fed the whey at the factories.

Pay by Test.—Twenty-two factories paid by test, adding two per cent. to the fat reading.

New Milk Cans.—One thousand one hundred and fifty-one new milk cans were purchased and one hundred and seven cans were condemned as unfit for use.

Septic Tank.—Thirteen factories have septic tanks for disposal of wash water, and these, with one or two exceptions, are working satisfactorily.

Sanitary Condition.—One hundred and twenty-seven factories are reported in good sanitary condition. The others are only fair; a few are in very poor condition and must be improved before opening next season. Several factories that were in poor sanitary condition in 1915 have been put in very good shape.

Prosecutions.—Forty-three patrons pleaded guilty before a magistrate to delivering deteriorated milk to cheese factories. Fines from ten to fifty dollars were imposed.

Annual and District Meetings.—From November 1st, 1915, to October 31st, 1916, 73 factory meetings were attended by the instructors and myself. Total attendance 3,491.

Expenditure for Improvements.—The total expenditure for factory improvements amount to $26,540.

No.....

Ontario Department of Agriculture

DAIRY BRANCH

.....19

Dear Patron:—

This card is sent to you with the desire to indicate clearly the defects in your milk, and to offer brief suggestions for remedying these defects, in order that yourself, the maker and other patrons may mutually benefit and the quality of cheese may be kept up to standard.

REMARKS:

.....*Local Instructor*

[SPACE FOR "DISC"]

The above disc shows the amount of sediment contained in a pint of your milk sent to the factory today.

Care is necessary to avoid dirt getting into the milk. Dirt is one of the chief causes of bad flavors and taints in the cheese.

(See over)

The Milk delivered in your name to the factory on.....19 was .....and not in proper condition to make finest cheese. Please note suggestions following:

MILK DEFECTS	PREVENTION
SOUR OR OVER-RIPE	(a) **Cool** the night's milk to 65 degrees F. or under, by placing the cans in a tank of cold water immediately after milking. (b) **Scald** all cans and other utensils with boiling water after washing.
GASSY OR TAINTED	(a) **Keep out** of the milk, hairs, bits of straw, particles of manure and other dirt. Do not keep milk where it will absorb odors. (b) **Prevent** cows from **Drinking** or **Wading** in BAD water. **Discard** rusty cans. **Cool** as above.
STABLE FLAVOR	(a) Keep stable and cows **Clean.** Remove milk from stable as soon as milked. **Cool** as above.
FOOD FLAVOR	(a) Do **Not** feed turnips or other highly flavored food. **Cool** as above.

"KEEP MILK CLEAN AND COLD"

(See over)

INSTRUCTION WORK, 1916.—CHEESE.

Instructor and Group.	Factories visited.	No. of Patrons.	No. of full day visits.	No. of call visits.	No. of Patrons visited.	No. of curd tests.	No. of lactometer tests.	No. of Babcock tests for adulteration.	No. of Sediment tests.	Factories making Whey Butter.	Factories paying by test.	Factories having ice cool curing room.	Factories pasteurizing whey.	Whey fed at factory.	Average per cent. fat in milk for season.	Average per cent. fat lost in whey for season.	New factories.	Cost of new factories.	Estimated expenditure for other improvements.	Total expenditure.
																		$ c.	$ c.	$ c.
LISTOWEL—																				
R. A. Thompson	33	2,873	68	103	7	0	3,500	24	1,700	1	8	3	22	2	3.43	.23	1	1,500	1,900 00	3,400 00
STRATFORD—																				
G. M. McKenzie.....	28	2,440	93	82	53	24	6,252	294	841	0	11	10	17	4	3.45	.22	0	.....	5,245 00	5,245 00
INGERSOLL & WOODSTOCK																				
A. E. Gracey	30	1,599	66	111	34	32	3,991	338	1,200	1	3	1	16	0	3.31	.25	..	.....	7,145 00	7,145 00
SIMCOE & BRANTFORD—																				
Geo. Travis.....	27	2,155	47	88	30	19	2,400	416	2,000	1	0	1	6	0	3.36	.22	..	.....	3,225 00	3,225 00
LONDON—																				
T. F. Boyes	33	2,618	80	104	25	8	4,372	290	1,716	0	0	1	11	0	3.31	.22	..	.....	7,625 00	7,625 00
Totals and Averages ..	151	11,685	354	488	149	83	20,515	1,362	7,456	3	22	16	72	6	3.37	.23	1	1,500	25,140 00	26,540 00

Creamery Instruction Report, 1917.

One hundred and twenty-nine creameries and 76 cream buying stations were visited by the three creamery instructors. Six new creameries were opened and two closed. Butter prices for the past season were the highest on record; estimates indicate a decrease of about fifteen per cent. from the output of 1915.

Quantity of Butter.—In 1915 Western Ontario creameries produced 21,022,761 pounds of butter. About one-third of the cream to make the 3 million pounds of butter turned out by the Toronto creameries was produced in Eastern Ontario. Including 847,481 pounds of winter butter produced by the cheese factories we have a total production of 21,870,242 pounds of butter. This is an increase over 1914 of 1,754,038 pounds, instead of a decrease as was anticipated in the fall of 1915 before the actual returns were obtained.

Quality of Butter.—The early output, continuing up to the end of June, was exceptionally fine quality. When the warm weather developed into a long period the quality, in many cases, fell off, owing chiefly to a lack of proper cooling of the cream by some of the producers. It was a fact, however, that a number of creameries, according to our market reports, maintained a high quality throughout the season. This indicates that the quality can be kept up during the warm season if proper precautions are taken by the producer, the creamery men and the transportation companies.

Patrons.—Thirty-eight thousand five hundred and thirty-four patrons supplied cream to the creameries.

Average Per Cent. Fat in the Cream.—28.97.

Creamery Visits.—Three hundred and fifty-three full day visits and sixty call visits were made to the creameries and forty-six special call visits to the cream buying stations.

Moisture in Butter.—The average moisture content of five hundred and seventy-four samples of butter was 14.73 per cent.; a proportion of these tests was made at each creamery; thirty-six samples contained over 16 per cent. moisture and were taken from twenty-one creameries.

Salt.—The average salt used and retained in the butter according to four hundred and sixty-four tests made was 5.28 per cent. and 3.2 per cent., respectively.

Testing Cream.—Sixty-two creameries used the metric scale for weighing cream samples for testing. Two creameries only used the oil test.

Pasteurization.—Twenty-five creameries pasteurized the cream, all or a part of the time.

Cooler.—Sixty-three creameries used the cooler.

Culture.—Eighteen creameries used pure culture.

Grading.—Five creameries are grading the cream for churning.

Sewage Disposal.—Twenty creameries have septic tanks for disposal of sewage.

How Cream is Collected.—Sixty-one creameries collect in individual cans; fifty-four in large and jacketed cans; fourteen in cream tanks.

Storage.—Forty-two degrees average temperature of storage.

Expenditure.—Six new creameries were built at an estimated cost of $29,700.00 and $103,598.00 was spent on general improvements, making a total expenditure of $133,298.00. Several creameries intend to improve their present plant this year.

Annual District Meeting at Guelph.—This meeting, held on December 5th last, was the largest attended of any previous meeting. Many important

questions of vital interest to the dairy industry were discussed, including the Dairy Standards Act, the commercial grading of cream and butter, experiments with rennet substitutes in buttermaking and with fermented milk. Two important resolutions were passed: (1) Requesting the Federal Government to maintain the present restrictions against the manufacture and sale of oleomargarine in Canada. (2) That all milk sold wholesale in Ontario be sold subject to the test in accordance with the Dairy Standards Act.

Many of the creamery men present expressed appreciation of the plans outlined for the commercial grading of butter and standards for cream grading were discussed.

One of the objections frequently raised in connection with the grading of cream is, that where the cream is not collected in individual cans it would be difficult to grade. With a view to securing some information on this point the three creamery instructors conducted some experiments during the months of July and August, the results of which throw some light on this problem. The work will be repeated again this season at other creameries and with other buttermakers.

In carrying out these experiments the instructors accompanied the cream haulers over certain cream routes, took notes of, and graded the various lots of cream supplied by the producers, according to a standard previously agreed upon. Samples of the cream were taken by the hauler in the usual way, using the ordinary sample bottles. No special precautions were taken to change the usual methods of handling the samples during this time, the samples were under the average conditions and exposed to the average temperature.

On arrival at the creamery these samples of cream were graded directly from the sample bottles by the buttermakers and instructors without referring to the previous grade of the cream made by the instructors at the farm. Two chief points were in view, (1) How many of the samples would be placed at the creamery by the instructor in the same grade in which the cream was placed at the farm. (2) Would the buttermaker's grade of the samples agree with the grading of the instructor at the farm and at the creamery.

240 lots of cream were graded.
162 lots graded first.
67 lots graded second.
11 lots graded third.
7 lots should have been rejected at the farm as not fit for third grade.

Practically 90 per cent. of the samples were placed at the creamery in the same grade by the buttermaker and instructor in which the cream was placed or graded at the farm.

In 85 per cent. of the samples the buttermaker's grade agreed with that of the instructor.

The conclusion drawn from these experiments were that:

(1) If reasonable precautions are taken in keeping the sample bottles clean and also cool during transit until arrival at the creamery, there is every reason to believe that under Ontario conditions, the grading might be done closely enough by sample, for all practical purposes.

(2) The buttermakers who assisted in this work placed the samples of cream, with few exceptions, in the same grade as the instructor.

Where the cream is received at the creamery in individual cans grading should be a much less difficult problem.

A summary of the experiments revealed the following relation between the grade of the cream, average temperature and percentage of fat:

Average Temperature of all Samples	Average per cent. Fat in all Samples
1st Grade.....65.3 degrees	1st Grade 30.01%
2nd Grade .....68.1 degrees	2nd Grade.....27.6 %
3rd Grade.....73 degrees	3rd Grade.....25.7 %

SUMMARY OF CREAMERY REPORT, 1916.

	Instructors.			
	McMillan.	J. B. Smith.	G. Rickwood.	Total
No. Creameries visited	46	44	39	129
No. cream buying stations	.....	.....	.....	76
No. of patrons	15,603	11,851	11,080	38,534
Pounds of butter made, 1916	.....	.....	.....	21,870,242
Gain over 1914	.....	.....	.....	1,754,138
No. full day visits	119	112	122	353
No. call visits	14	21	61	96
No. patrons visited	134	75	25	234
Average per cent. fat in cream	27.93	28.5	30.5	28.97
No. tests made for moisture in butter	237	180	157	574
Average per cent. moisture	14.31	14.2	15.68	14.73
No. samples showing over 16% moisture	9	12	17	38
No. creameries these samples taken from	7	6	8	21
No. of tests made for salt in butter	231	100	133	464
Average per cent. salt used	4.89	5.5	5.46	5.28
Average per cent. salt left in butter	2.22	3.3	4.1	3.2
No. of Creameries Cream Collecting	46	43	34	123
" " Separator	.....	1	5	6
" " using Babcock test	44	44	39	127
" " " Oil test	2	.....	.....	2
" " " Scales (Metric)	23	20	19	62
" " " Pipette	20	24	20	64
" " " Cooler	23	22	18	63
" " " Pasteurizer	12	3	10	25
" " " Culture	7	2	9	18
" " " Grading cream	.....	3	2	5
" " having poor water supply tank	.....	2	4	6
" " using septic for sewage	4	4	12	20
Average temperature of storage	44	38	46	42
Expenditure { Creameries	(3)	(0)	(3)	
Expenditure { General	$11,700 00	.....	$18,000 00	$29,700 00
Expenditure { Improvements	46,478 00	$30,000 00	27,120 00	103,598 00
Totals	$58,178 00	$30,000 00	$45,120 00	$133,298 00

EXPERIMENTS IN THE USE OF RENNET SUBSTITUTES FOR CHEESEMAKING.

T. J. McKINNEY, O.A.C., GUELPH.

I will give a brief summary of the experiments carried on with rennet substitutes at the Dairy Department of the Ontario Agricultural College, during the past summer.

Home-made Rennet vs. Hansen's.

The home-made rennet was prepared by cutting one rennet into pieces and putting it to soak in one-half gallon of salt water for at least four days, during which it was pounded or squeezed as often as possible; then it was strained through cheesecloth and used at the rate of five pounds to one thousand pounds of milk. There were three experiments conducted by dividing the milk evenly between two vats, using three ounces of Hansen's rennet to one thousand pounds of milk in one vat, and the home-made rennet in the other. The average acidity at the time of setting was .19 per cent. The home-made rennet required an average of ten minutes longer for coagulating the milk than did Hansen's rennet. The average percentage of fat in the whey was for Hansen's, .223; for the home-made, .266 per cent.

The cheese per one thousand pounds of milk for Hansen's was, 87.33 lbs.; for home-made rennet, 86.93 lbs. The average score of cheese for Hansen's was 89.20 and for home-made rennet 89.10. We held two lots of those cheese for two months for the second scoring. The average score for Hansen's was 88.25, and for the home-made 88.50. One drawback found with the home-made rennet was, they could not all be got of the same strength.

2. To some of the home-made rennet we added from ½ to 1 per cent. of acetic acid as a preservative, and also to see the effect on coagulation. Some of this rennet was held for six weeks; we could not detect any bad flavors, it being then as nice as when made. The acidity of the milk at setting was similar in both vats. Hansen's rennet required an average of 24.28 minutes to coagulate the milk; the home-made required an average of 23.72 minutes. Hansen's rennet produced per 1,000 lbs. of milk 88.67 lbs. of cheese, and the home-made rennet 87.97 lbs. of cheese. The loss of fat in the whey from Hansen's averaged .224 per cent., and from home-made .257 per cent. The average score of the cheese made with Hansen's rennet was 89.98 and for the home-made rennet lots 88.98.

3. Seven experiments were made with home-made rennet to which was added from ½ to 1 per cent. of hydrochloric acid in comparison with Hansen's rennet. The milk was the same in both vats and handled with the same acid throughout the making. Hansen's rennet required an average of 22.28 minutes to coagulate the vat of milk and the home-made required an average of 34 minutes. The yield of cheese per 1,000 lbs. of milk for Hansen's rennet was 87.97 lbs. of cheese; for home-made rennet 86.51 lbs. The average score of cheese for Hansen's lots was 89.73, and for home-made rennet lots 89.35. We held one lot of those cheese for five weeks. (The score was the same at first scoring, but at the second scoring the home-made scored 1 point higher than did the cheese made with Hansen's.) We held some of this rennet for six weeks without any bad results. We made cheese from some of this rennet held for four weeks which gave the best results in any of the seven experiments.

Pepsin vs. Rennet.

We conducted eighteen experiments by using 3 ounces of Hansen's rennet to 1,000 lbs. of milk in B vat, and in C vat we used ¼ ounce of pepsin dissolved in 8 ounces of pure water to 1,000 lbs. of milk. We divided the milk evenly between the two vats. The average acidity at the time of setting was .18 per cent. in both vats. Hansen's rennet required an average of 28 minutes to coagulate the milk, the pepsin required an average of 37.77 minutes. The average loss of fat in the whey for Hansen's was .25 per cent. and for the pepsin .327 per cent. The yield

of cheese for Hansen's rennet per 1,000 lbs. of milk was 91.96 lbs.; for pepsin 89.79 lbs. The average score of the cheese for Hansen's 90.59 and for pepsin 89.70. We held two lots of those cheese for six weeks for second scoring. The average score for Hansen's rennet for the first scoring was 90.5, for the second scoring 91.0, for pepsin for the first scoring 90.25 and for the second scoring 90.125. It would be better to use a stronger solution of pepsin.

Pepsin and Rennet vs. Rennet.

Four experiments were made using 3 ozs. of Hansen's rennet to 1,000 lbs. of milk in B vat compared with using 1½ ozs. of Hansen's rennet and ¼ oz. of pepsin dissolved in 8 ozs. of pure water to 1,000 lbs. of milk in C vat. The acidity at setting averaged .185 per cent. in both vats. Hansen's rennet required an average of 22.75 minutes to coagulate the milk, and the pepsin and rennet required an average of 17.50 minutes to coagulate the milk. The average loss of fat in the whey from Hansen's rennet was .252 per cent. and from pepsin and rennet .23 per cent. The yield of cheese for the rennet was 87.24 lbs. of cheese per 1,000 lbs. of milk and for the pepsin and rennet 88.77 lbs. of cheese per 1,000 lbs. of milk. The average score of cheese for the rennet was 90.10 and for rennet and pepsin 89.60. We did not score any of those lots of cheese the second time.

There were five experiments conducted by using 3 ozs. of Hansen's rennet to 1,000 lbs. of milk in B vat; in C vats were used 1½ ozs. of Hansen's rennet and ⅛ oz. of pepsin dissolved in 8 ozs. of pure water per 1,000 lbs. of milk. The acidity at the time of setting was the same in both B and C vats, being .182 per cent. Hansen's rennet required an average of 27.6 minutes coagulating the milk; the rennet and pepsin, an average of 28.2 minutes coagulating. The average loss of fat in the whey from the rennet alone was .258 per cent. and from rennet and pepsin was .296 per cent. The yield of cheese by using the rennet alone was 86.09 lbs. of cheese per 1,000 lbs. of milk and from the rennet and pepsin 85.76 lbs. of cheese per 1,000 lbs. of milk. The average score of the cheese made with the rennet alone was 89.40; and for the rennet and pepsin lots, 89.48. We held one lot of those cheese for two months for second scoring. The score for Hansen's rennet for the first scoring was 89 and for the second scoring was 88.5. The score for the rennet and pepsin for first scoring was 88.5 and for the second scoring 88. This test seems to give the best results and did not take as much pepsin.

Miscellaneous Tests.

We conducted one experiment by using 3 ozs. of Hansen's rennet to 1,000 lbs. of milk in B vat and in C vat we used 1½ ozs. of Hansen's rennet to 1,000 lbs. of milk also 5 drams of hydrochloric acid. The one with half the usual quantity of rennet and having hydrochloric acid added, required 17 minutes longer to coagulate the milk than did the rennet alone, lost .08 per cent. more fat in the whey, and the cheese weighed 1.50 lbs. less, but the score of the cheese was .5 points higher than for the cheese made with the usual quantity of rennet.

Another experiment was made by using 3 ozs. of Hansen's rennet to 1,000 lbs. of milk in B vat; in C vat we used 2 ozs. of Hansen's rennet to 1,000 lbs. of milk, also 10 drams of acetic acid to 1,000 lbs. of milk. The milk with the acetic acid added required seven minutes longer to coagulate the milk and lost .03 per cent. more fat in the whey, the cheese weighed one pound less but the score of the cheese was the same for both lots of cheese.

Acidity of Milk and Spongy Pepsin.

Two vats of milk marked "B" and "C" were used to compare the effect of acidity on pepsin coagulation of milk one-eighth of an ounce of 1:6000 spongy pepsin was dissolved in 8 ozs. of pure water and added to each vat, but C vat of milk was held until it developed more acid than B vat. B vat was set with .18 per cent. acidity and C vat with .19 per cent. acidity. B vat required 55 minutes to coagulate the milk and C vat 38 minutes, a difference of 17 minutes. The loss of fat in the whey was .02 per cent. less in C vat. The cheese from C vat weighs 1.4 lbs. more than B vat and the cheese scored .5 points higher in C vat.

Rennet vs. Renzyme.

Two experiments were conducted using 3 ozs. of Hansen's rennet per 1,000 lbs. of milk in B vat compared with using ¼ oz. of Renzyme dissolved in 8 ozs. of pure water to 1,000 lbs. of milk in C vat. The acidity at setting averaged .17 per cent. in both vats. Hansen's rennet required an average of 35 minutes to coagulate the milk and the Renzyme required 37.5 minutes.

The average loss of fat in the whey from Hansen's rennet was .24 per cent. and from Renzyme .245 per cent. The yield of cheese for the rennet was 90.45 lbs. per 1,000 lbs. of milk, and for Renzyme 89.77 lbs. of cheese per 1,000 lbs. of milk. The average score of cheese for the rennet was 90.0 and for Renzyme 89.5.

"R.P." Rennet.

We conducted one experiment by using 3 ozs. of Hansen's rennet to 1,000 lbs. of milk in one vat and in the other we used 4 ozs. of "R.P." rennet to 1,000 lbs. of milk. They were both the same length of time coagulating the milk. The vat of milk in which we used the R.P. lost .04 per cent. more fat in the whey than did the vat of milk in which we used the rennet.

The yield of cheese per 1,000 lbs. of milk for Hansen's rennet was 95.41, for the R.P. rennet, it was 95.90 lbs.

The R.P. is a substitute for ordinary rennet, manufactured by Chris. Hansen's laboratory. It is a mixture of rennet and pepsin.

Conclusions.

If it is possible to obtain a sufficient supply of rennet at a reasonable price it will give the best results; if not, use about 1½ ozs. of rennet, and ¼ oz. of powdered or "spongy" pepsin, strength 1:6000, to coagulate 1,000 lbs. of milk. If pepsin alone is used better results are got by having a slightly higher percentage of acidity on the milk than when using rennet. This increased acidity should be about one to two hundredths of a per cent.; that is, if setting at .17 with rennet, have the milk from .18 to .19 for pepsin. Home rennet supplies should be conserved, and used, so far as possible to help out the commercial extracts.

ADDRESS BY MR. BARR.

For address by Geo. H. Barr, on "The Use of Pepsin and Other Substitutes for Rennet in Cheesemaking," see page .

Q.—Did you use a measure or weigh these different substitutes that you used?

A.—We got out a little measure; the full of that measure was sufficient for one thousand pounds of milk.

ADDRESS.

GEORGE A. PUTNAM, DIRECTOR OF DAIRYING, TORONTO.

I believe I am standing before the princes in agriculture when I face a body of dairymen. We have been accustomed in the Department to look upon dairymen as aggressive, up-to-date farmers. Dairying is one of the outstanding branches of agriculture. It needs no argument on my part, or on the part of any other person, after fifty years of development, to prove that dairying is here to stay, and is one of the permanent industries of the Province. Even in a lean year dairying gives a good return.

I think it is quite fitting that you should have met on this the occasion of the fiftieth anniversary of the formation of your Association in a district that has provided such a large number of capable, public-spirited, enthusiastic men who have stood by your Association through the dark days as well as through the bright. We can look forward to the future with confidence. You have a number of capable men who are standing by you to-day, and you need have no fear as to wise guidance and good support in the days to come. I do not know that you need much encouragement in these days of high prices. There never was a time when we in the city so appreciated the milk that we are getting and the butter and cheese that we are getting, even at the high prices. At the present prices all these products are in high demand and they are the best and cheapest foods that we can purchase.

At the suggestion of Mr. Roadhouse, the Deputy Minister, we are publishing in the Department a bulletin dealing with the comparative food values of our various foods. That bulletin is being prepared by Prof. Harcourt and shows that dairy products hold a very favorable position among our common foods.

I wonder if the dairy farmers of the Province fully appreciate what this Association has meant to them. The business of dairying is a little different to other lines of production on the farm. It is not only a matter of production on the part of the farmer, but associated with that and a very important item is the scientific manufacture of these products. While this Association has been, and always will be, made up to a large extent of the manufacturing end of the business, still the farmers of the Province owe a great deal to it. The dairy farmers are at a disadvantage, in that they have no central association of dairy farmers through which their wants might be made known and their views expressed. This Association has always looked to the interest of the dairy farmer, recognizing that the interest of the farmer was the interest of the manufacturer of dairy products. I think, therefore, that we can look forward with confidence to the wise guidance and liberal support of this Association in the interests of all those engaged in dairy farming.

Considering this as a permanent industry, it seems to me that there are several things which you should consider very carefully. One of these things is the maker, the man who is going to look after this industry in the future. Will you have a continuous supply of capable men in so far as manufacturing is concerned? You must recognize that in these days of high prices for labor we must make it attractive for capable men to enter the business of manufacturing butter and cheese. Although the ranks are fairly well filled at the present time, you must remember that you must always have reserves and these reserves must be men of ability. Judging from some of the offers to makers that I heard of

in Eastern Ontario, it appears to me that you cannot by such low wages attract capable men to the business. We must look to the future, and it is very essential that you should pay good wages, because you cannot get intelligent men unless the wages are attractive.

Then if you are going to have a permanent industry you must have good buildings and equipment. This is an age of readjustment, with milk powder factories, condenseries, and the city milk supply coming into competition with the cheese and butter factories. Some of you do not know just where you are at. The experience of the past few years holds a good deal of encouragement to the cheesemaker. I am sure that you have the best interest of the industry at heart, and you will look to it and see that every person gets a square deal in connection with the business.

One cannot appear upon a public platform without thinking of the world war which is our whole interest in these strenuous times. We heard last night that we must increase production, that is very important, and I need not enlarge upon it. Knowing something of what the farmers and their wives and sons and daughters are doing, I have not the assurance to say to them "Work harder. You should work longer hours." It is quite out of place for me, or any Government official to give such advice. But may I offer one or two suggestions to the man who is already working hard, and I think the farmer works harder the year round than any other class in the community. May I venture to suggest that you double up your teams so as to make the work of one man count for more. Last fall I saw in very large fields three and four teams plowing, each with a single plow. With proper equipment, one or two of these men could have been spared for something else. You know how to work out these problems, and I would appeal to you to give these matters careful consideration. You have been told that if you have to sell some of your stock, keep the good ones. keep the individual which will produce the greatest quantity of high quality. Mr. Rowell told you last night that the farmers were thought to be economical enough. I certainly have not the assurance to come before an audience from a rural district and ask them to economize when I see such extravagance in the city. It appears to me that a great many of the residents of our larger centres have not begun to consider economy. Merchants in most of the large cities will tell you that their business is from 30 per cent. to 40 per cent. larger than it was a year ago. Merchants who are dealing in things which are considered as luxuries by the great majority will tell you that their business has increased fully 40 per cent. upon what it was last year. When you see the rows of expensive automobiles, and the women dressed in the latest fashion, it is idle to come before an audience of farmers and say economize. Nevertheless, it is essential that we should all save as best we can. When I see the women in the cities going down to do patriotic work in six and seven thousand dollar automobiles and then when I hear from the women in the rural districts as to what they are doing along patriotic lines, women who have said "I have given the last cent I can give and I wish you would get in touch with some organization which will send us yarn so that we can work," I consider, but conclude that it is the rural people who are making the sacrifices.

In the early days the dairymen were looked upon as the leaders in co-operation and I think the dairy industry is an outstanding example of co-operation, which is largely responsible for the success which has attended your operations. Possibly there is not now so much need for co-operation in manufacturing, but there is

need for co-operation among dairy farmers. I wonder how much the farmers of Oxford County could have saved if they had had some central organization where they could have met six months ago and discussed ways and means whereby they could get a supply of feed stuffs for the winter. Thousands of dollars could have been saved to the farmers of the county if they had met together and approached their dealers. I believe in approaching the local dealer first, and if you had made arrangements with the local dealers early in the season you would have saved thousands of dollars. I think the farmers in every section should get together and form local clubs for the purpose of buying whatever is necessary for carrying on their business, for successful farming to-day is more a matter of business than manual labor.

There is a tendency on the part of some farmers to say, "I have a lot of stock and the price is high and the price of feed is high, and I think I will be safe in selling both feed and stock." The farmer who has stock to-day is absolutely safe in keeping it for the future market. I would advise every farmer who can keep his breeding stock to do so, because the prices are not likely to go down and are almost sure to rise.

You can depend upon the Department of Agriculture to stand by the Association. The Department will continue to give you that support which they have given you in the past, and we are always glad to have your advice and co-operation in the work of dairying in the Province of Ontario.

EARLY RECOLLECTIONS OF CHEESE MAKING IN WESTERN ONTARIO.

A. T. Bell, Tavistock.

I consented rather reluctantly when asked by your worthy secretary to give a short talk or paper on my long experience as a cheesemaker on this Fiftieth Annual Meeting of this Association.

In the winter of 1870-71, I came up from my home a short distance east of Toronto to visit an uncle at Brownsville. He asked me what I was going to do next summer; in reply I said that I hardly knew yet just what I would do. Whereupon he said, "Why not learn cheese making. So we interviewed the manager of the factory, and I engaged to work for him for the coming season of 1871. I was to weigh in the milk as I had been rather well used to scales, having been with a grain dealer for several seasons. I got along nicely with the weighing, and after a short time became quite familiar with the rest of the work which was to be done in a cheese factory. Nothing of very much importance happened that season. One thing we had was plenty of work—long hours, early and late which kept a fellow from getting lonesome. We made the cheese on the "granular system," which no doubt some of the older cheesemakers here are familiar with, keeping the whey on the curd until sufficient acid by hot iron test was developed for salting. Then came a rush getting the whey run off as soon as possible, scooping the curds out into the sinks, stirring like mad to keep them from matting when the whey was pretty well drained off, salting and stirring in quickly. This work generally came on about noon, and it was either bolt your dinner or wait until it was safe to leave the curds, the time being very uncertain as you will all know. This part of cheese-making was not very satisfactory: stirring the curd so much soon began to wear the skin off my finger

tips, and blood would show occasionally; so I had little caps made of leather to put on the tips and that helped me out. Thimbles were also used for the same purpose, but on account of the hideous noise on the tin bottomed sink they were discarded. It was almost impossible to make an even quality of cheese in those days. There was some good and others not so good, and they were kept for months, often in very unsuitable curing rooms. That summer we had three months' cheese right through the hot weather, and it was quite a common experience to have them leak whey while on the shelves or in the "setters" and racks. The setters were similar to box covers, but more strongly made, and were preferred especially for leaky cheese, as they were liable to slide off the shelves. Some cheesemakers at that time expressed themselves as favorable to leaky cheese, which did not meet with my approval. The Brownsville Company had at that time two branch factories, one in Bayham, the other at Campbelltown near Tillsonburg. I made arrangements with the company to run their Campbelltown factory for the next season, 1872, being thrown on my own resources with only one season's experience. I soon found there was a good deal still to learn; and not having any instructors at that time we were compelled to watch ourselves very closely. We were groping in the dark, as it were, just feeling our way. I often have wondered that we ever got along, knowing so little about our business. However, those very conditions compelled us to experiment some, and now that I had become my own boss, I took advantage of it. Before we started to make at the factory that spring I had received some information from a book published on the other side about packing and milling curds, and as I was boarding at the time with a farmer who had quite a number of cows, and had at times made some home-made cheese, now that he had on hand the cheesemaker he turned over the making to me. I took it upon myself, unknown to him, to pack and mill the curd for two of the small cheese, having found a small old peg mill lying around which helped me out, and you may rest assured that I watched those two small cheese and found that they had a much smoother and closer texture than the ones usually made. Well we started to make at the factory in April and on the 10th day of May when I still found those two small cheese all right I packed the curds that day and watched the cheese made from them with hope and fear, I did not know just how the buyers would like them; but about the last of the month Mr. Findlay, who bought for E. Caswell, Ingersoll, came to inspect. I drew his attention to the cheese made from the packed curd, and he examined them carefully and pronounced them choice, and wanted to know how I had made them. You may be sure that I felt confident that we were on the right track; so from the first of June we packed all the curd, running the whey off comparatively sweet. Packing in the vat from that time on we had a more uniform cheese.

Eighteen hundred and seventy-three did not bring any noticeable change in cheese-making. The directors offered me their main factory to run for the coming season of 1874, which I accepted, continuing the packing of the curd with good success also in 1875. In the fall of that season two of the directors of what used to be called the "Big Factory" came to see me and offered me their factory to run. I accepted the offer, as I felt that I would like to run the biggest factory in the country, and for four years I was with them. I found some straightening up to do there. Milk at that time was all being delivered at the factories twice a day, a great deal of it carelessly handled by the patrons. I procured a supply of glass tumblers, putting some milk from each patron into tumblers as it was

being delivered, setting them where the temperature was fairly warm, and noting the change as the time went on. In this way I was able to locate the faulty milk. The curd test came later, and was an improvement. All cheese-makers who have had experience in taking in and working up new milk will have found the difficulty of detecting faulty milk when fresh. Those tests were a great help in locating the faults. I also felt the necessity of having a personal interview with those patrons who were sending in the faulty milk; so I would strike out early in the evening to get to as many of them as I could about milking time, taking always one of the directors with me, which I will not say was the best plan. I was more than surprised at some things we found out. To give you an idea, we found nearly all using cloth strainers and some none too clean. We found some put to a double purpose, washing cans and pails as well as straining milk; but when the patron's attention was drawn to the mistake they were making they very willingly made a change, and purchased tin strainers which could be more easily cleaned. There was a noticeable change for the better in the condition of the milk from that time on, and by close attention to the milk preparatory to setting we found an improvement in the quality of the cheese. I also made a change in the matting of the curd soon after going to that factory, changing from the vat to matting in the sink, by this means getting a more uniform cheese.

In the fall of 1879, I made an agreement with the Hon. Thomas Ballantyne to run his Black Creek factory for the following season, 1880.

By this time I was getting tired of taking in milk twice a day, and the Saturday night's making, which was the prevailing custom in those days, especially in large factories, I had said many a time that I would not be satisfied with cheese-making until we received the milk but once a day and no Saturday night's making. In Black Creek I had my wishes granted, I did not find much trouble with the patrons in doing away with the Saturday night's making, Mr. Ballantyne giving me a free hand in the matter.

Soon after going to Black Creek, a test for milk to ascertain the proper ripeness for adding the rennet came into use called the "cup test," which was as follows: Take a cup of milk from the vat to be set, adding a spoonful of extract stirring rapidly for an instant, then withdrawing the spoon and noting the number of seconds until the milk stopped whirling. I must say that we prized that test very much indeed. By this test we were able to make a still more uniform cheese, which was most desirable. Soon after it came into use an improvement was made on this test by using graduated glasses to get the exact quantity of milk and extract, and it was called the rennet test.

While at Black Creek I had some rather interesting experiences. Mr. Ballantyne, who bought cheese in different parts of the country, would meet some strange cheesemakers, men who were wholly unfit for their business, and he would send me to try and help them out of their difficulties. To give you an idea of what was going on I will just mention one.

Mr. Ballantyne had gone into Essex County to see some cheese with a view to buying. On his return he said they were just spoiling good milk up there, and he wanted me to go at once and try to straighten up things. On my arrival at the station, one of the directors of the factory met me. I told him I had come to try and help his cheesemaker out of some difficulty. His answer was that the man had run away, and what would they do. I asked if there was any person at the factory. He said the helper was still there. I said I would go out and look over the situation and decide. Arriving at the factory we met the helper,

and when I told him my business, he seemed only too glad to do anything I proposed. I found the conditions very bad indeed. Their cheesemaker, who had been living in Detroit, claimed that he could make "all kinds of cheese," and the appearance of them in the curing room would convince you that he was not far wrong, for I have never found such a variety of cheese before or since. Also in the making-room there was plenty of evidence of the runaway cheesemaker's incapacity. He could not or would not use the syphons for running the whey off, and had punched a big hole in the end of each vat for that purpose. This had been going on for over two months, and you may imagine the odor. I advised a general cleaning up for the next day, to have the tinsmith come along and fix up; also to order in the milk for the following day. To give you an idea of this clever cheesemaker, when the pans of the vats were taken out the putrefactive mess had to be shovelled out with the scoop-shovel. I left the factory about this time in charge of the helper and directors, as I was beginning to feel that it would be wise for me to get out to the fresh air, and you may rest assured I went quite a distance. Everything was cleaned and fixed up before night. I had looked through the cheese and found a number not fit for anything, and had them put in the fire and destroyed. Two months' make were on hand and could not be sold, so they were consigned. I stayed there several days until I thought the helper could be entrusted with the making for a day. I arranged with the directors to send them a maker, and all went well for the balance of the season. While in Black Creek I had several calls away similar to that mentioned, but time will not permit me to dwell upon them. I may say that in two other cases I had to send a competent man to take the place of the incompetent.

In the winter of 1890 I bought out a half interest in the Tavistock Cheese Factory, and removed there. That season Prof. Decker from the Wisconsin Dairy School, Madison, came over to Canada principally to find out what we were doing here in the dairy business, staying at our place most of the time while here. From him I got the first intimation of the Babcock Test, which is now so much in use. The test for milk at that time was very unsatisfactory, and we were ready to receive a reliable one with open arms. The Professor informed me that Dr. Babcock at that time was just proving out the accuracy of his invention, and would have it ready for the public by the time their Dairy Class would meet in the winter, and he advised me to attend the Dairy School in Madison that winter where I could get familiar with the Babcock and Quevenne Lactometer, which I did along with three others from Canada. We spent a very pleasant and profitable time while there, bringing a Babcock machine with us when we came home. The directors of this Association decided that it would be a good plan to have a cheese factory set apart where cheesemakers could go and get instructions in the use of the Babcock and Quevenne tests, also where some experiments could be carried on in making cheese under different conditions, high and low testing milk, etc. Tavistock was chosen, being convenient of access and near the village, where good accommodation could be had for the cheesemakers. I was chosen as instructor. Now we had a reliable test for milk, and the object lesson of cheese made from different qualities of milk, which showed the great injustice of the pooling system. This gave rise to the question of paying for milk according to quality, which we adopted in 1893 with good results, continuing the system up to the present time. At that time I was called away quite often to visit factories where the makers were having trouble. One peculiar instance I might relate: I had a telephone message to go to a certain factory where the cheesemaker had

got stuck altogether, and had refused to take in the milk. I tried to find out over the phone what the trouble was, but could not well make out. I told the person, who was one of the directors, to order in the milk for the next day that I would be along on the night train. On my arrival I found the cheesemaker very much worried and his wife almost in hysterics. He gave me several reasons as to his failure. He thought the milk was bewitched, and wanted me to investigate that night, which I refused to do. I asked to be shown to my sleeping apartments saying that I would attend to that in the morning. I then found quite a lot of curd in the sink from the last day's make, crumbly and sour. Part of the curd had been fed to hogs and chickens. The directors had come to the factory to watch proceedings, and occasionally ask what was the matter. I told them we would likely find out before long. When the milk was in and heated to the proper temperature, I made a comparative test between his extract and mine, for on those trips I always took with me a small bottle of Hansen's extract and a guaranteed thermometer. I found my extract to be about nine times as strong as his. When I had the milk ready for the rennet, the maker asked me how much he should bring. My answer was "a pail full." He looked at me with surprise. However, he brought it, and I put it all into the vat of milk and watched carefully for coagulations which came on in the usual time. I told the directors that we had found out the trouble. They had suggested the sour whey tank as the probable cause. The curd worked along quite normally, and when the time came for the hot iron test, the maker looking on said for the last month he could not get the curd to work like that, and now blamed someone for adding water to the extract as a trick. I never found out just how it came about. I advised to get a new supply and throw out the old which he did, and I did not hear of him having any more trouble.

In the winter of 1893 I went to Guelph, and acted as cheese instructor for the first Dairy Class held at the Ontario Agricultural College, and was there at the same work for the winters of 1894 and 1895. Soon after going there the proper use of a starter came into use, and was a great help to the cheesemakers; also the acidemeter, a more scientific test for determining the per cent. of acid in milk, whey or curd, came into use. With all those improved tests, the cheesemakers of to-day who are using them with skill are enabled to become masters of their business and are making a very uniform class of cheese. Pressing work at home for the winter of 1896 prevented me from going to Guelph as instructor. I may say that my associations while there with Prof. Dean and the rest of the staff and dairy students were of the most pleasing nature, and I can say very truthfully that I always look back with pleasure to the days I spent there.

In 1898 we started to use ice in our curing-room, which at that time was becoming a common practice. It was a help and a stimulant to aim at something better. Some tried the sub-earth duct; others forced cool air into the rooms by fans. Watching them closely, I was never quite satisfied that they were the proper thing. But when the system in use to-day for the cool curing of cheese was demonstrated, I felt satisfied that it would fill the bill, and we lost no time in getting our curing-room fixed over, and I must say that this improvement has given me more satisfaction than any of the others mentioned. I had spent many anxious days in hot weather in sympathy with the cheese, and now, although I am not in active touch with the dairy business, will always welcome any improvement which tends to raise the quality of cheese and butter.

THE CHAIRMAN: Before proceeding any further with the programme this

afternoon I have a very pleasant duty to perform, but before doing so I wish to thank the Directors and members of the Association for the courtesy and many kindnesses they have extended to me during my term as president. Our new president needs no introduction to the dairymen of Western Ontario, and it gives me much pleasure to ask our new president, Mr. R. W. Stratton, to now take the chair.

R. W. STRATTON: I thank you for the honor you have conferred upon me in electing me President of this important Association. My only regret is that you did not select someone better able to fill the position. However, I will do my best, and owing to the good work our secretary, Mr. Frank Herns, has done in the past, and knowing that he will be behind me in all my efforts for the good of the Association, I will undertake the work with a feeling that I am backed by a good secretary and sympathetic members.

THE WAR AND ITS EFFECT ON THE DAIRYING INDUSTRY.

J. A. RUDDICK, DAIRY COMMISSIONER, OTTAWA.

I can assure you that I am always glad of an opportunity of visiting my native county. As time goes on I see evidences of progress and prosperity. I am prouder than ever of the district which my father helped to hew out of the wilderness. There have been marvellous changes in this district since 1844, when my father, as a small boy settled on a farm in the township of North Oxford. I sometimes wonder if you men fully realize that you have developed here one of the finest, if not the finest mixed farming districts on this continent. I say that in the light of an extensive acquaintance with the farming sections of both the United States and Canada. I sometimes wonder if the dairymen of Oxford County are fully aware that they have developed the dairying interest to a greater extent in this county than it is developed in any other county in Canada. The value of the cheese and butter and other milk products of this county for the past year was nearly three and a half million dollars. The average number of pounds of milk per cow delivered at factories is higher in this county than any other county in the Province, and I am of the opinion that the pounds of milk produced per acre is higher in Oxford than any other county. I frequently hold up Oxford as a shining example when addressing meetings in other places.

I am not here this afternoon to tell you about your own circumstances, but rather to speak on some international aspects of the dairying industry; because in these days of through transportation and commercial enterprise the world's supply and demand for dairy products becomes very important, and the future of the industry in Oxford and in Ontario depends to a very large extent on what is going to happen in England and Ireland and Denmark and Russia and Germany and other countries of the world. The price to-day for butter and cheese does not depend on local conditions, but on the world's market, and the great market for the world is the market in the United Kingdom. When Mr. Herns asked me for a title for my address I rather carelessly said, "The War and its Effect on the Dairying Industry," I should have said "Some of the Effects of the War on the Dairy Industry." I do not pretend to be able to decide just what the whole effect is going to be, but there are some things which appear to me to be quite

evident. Let us just look for a minute or two to conditions which prevail in the United Kingdom, the great market for dairy produce. For the sake of comparison I have taken the figures for eleven months ending November, 1914-15-16:

QUANTITIES OF BUTTER IMPORTED INTO GREAT BRITAIN FOR ELEVEN MONTHS ENDED 30TH NOVEMBER, 1914-15-16.

——	1914	1915	1916
	lbs.	lbs.	lbs.
Russia	66,853,920	109,731,216	3,868,704
Sweden	28,643,664	14,404,096	111,104
Denmark	181,809,040	138,741,568	117,775,840
Netherlands	20,148,800	4,991,504	3,342,304
France	27,322,624	37,224,432	13,966,064
United States of America	846,944	8,403,248	13,965,360
Argentine Republic	4,530,176	7,750,736	12,347,669
Australia	41,368,544	38,314,528	12,517,120
New Zealand	34,239,296	32,595,696	32,678,128
Canada	352,688	2,688,112	10,938,032
Other Countries	3,461,360	5,822,880	1,615,600
Totals	409,577,056	400,668,016	223,065,920

That is the key to the situation, and to the present high prices. There is an enormous demand in the United Kingdom which is not supplied at the present time. Russia, up to the time war broke out was a very important factor in the dairy business, coming next to Denmark in the amount of butter which they supplied to the United Kingdom. I have not been able to explain just why there is no butter coming from Russia at the present time. There was more butter imported from Russia in 1915 than there was in 1914, but this past year the supply seems to have been cut off almost entirely, especially during the past few months. There are several explanations, perhaps ocean transportation has something to do with it. Of course, it is easy to guess where the butter from Sweden is going. You will notice there is also a big falling off in the supply from the Netherlands. France keeps up her supply fairly well. There has been considerable reduction in the supply from Australia. One of the most significant increases is that of the Argentine Republic. There has been an increase in the quantity shipped from Canada and the United States. That gives you the situation with regard to the butter supply of the United Kingdom at the present time. Before Christmas we received a large volume showing the imports of all commodities, and the exports of everything from the United Kingdom up to the end of the previous month, up to about 20 days before we received the returns, showing that they are able to expedite matters in the old land when they take them in hand.

With regard to cheese the situation is slightly different. There has been an increase in the quantity of cheese imported to the United Kingdom comparing 1916 with 1914.

IMPORTS OF CHEESE INTO UNITED KINGDOM FOR ELEVEN MONTHS ENDED NOVEMBER, 1914-15-16.

—	1914	1915	1916
	lbs.	lbs.	lbs.
Netherlands	35,584,304	14,403,984	8,411,312
Italy	9,728,320	8,199,856	3,574,592
United States of America	2,692,368	50,699,376	29,862,224
Australia	2,033,360	2,346,176	112
New Zealand	75,573,232	71,720,096	73,970,736
Canada	119,657,440	133,784,560	153,683,040
Other Countries	2,873,360	1,772,400	1,297,856
Totals	248,142,384	282,926,448	270,799,872

While the shortage of butter is making the high prices for butter it is the excessive demand for cheese that is making the high prices for cheese, cheese being adopted in such a large measure for rations for the army. There is a situation which has developed in the last two or three weeks which may have some effect on the cheese situation and that is New Zealand has not been able to ship any cheese and it is accumulating there in very large quantities and there is no relief in sight.

I want to present the situation in Europe from another aspect. During my visits to Europe attending International Dairy Congresses and travelling in different countries it has been my privilege to make the acquaintance of a large number of men connected with agriculture and the dairy industry in various countries with whom I am in regular correspondence. These men thoroughly understand the situation in their own countries and throughout Europe, and they are men who can be depended upon. Sometime in September I wrote letters to correspondents in Denmark, Holland, France, Italy, Russia and other countries. I received a few replies which I will read to you because I think they may be of some interest. The first comes from Denmark from my friend G. von Elbrech, whom I know.

Copenhagen, Den., Dec. 16th.

J. A. Ruddick, Dairy Commissioner.

Dear Mr. Ruddick.—I have taken a long time to reply to your letter of September 11th, but I knew that a new volume of statistics, along the line of your inquiry, was coming out, and I thought I would wait until this was available. I got this to-day, and I hasten to mail it to you, hoping it will give you the information which you are looking for. I think it will take quite a long time before the dairy industry will be in order again. As far as I know, there is now a great diminution of cattle in most parts of the Continent, and the diminution will be greater and greater. The dairy production is small, and it will take a long time before it will be normal again because of the scarcity of money. I should think that the first years after the war will be good for us.

If you want any other information, I hope you will call on me, as I shall always be glad to do my best.

With kind personal regards, I am,

Yours truly,

G. von Elbrecht.

(EXTRACT FROM DANISH STATISTICS OF LIVE STOCK)

Milch Cows and Heifer Calves in Denmark

—	1914	1915	1916	Increase	Decrease
Milch cows	1,310,268	1,281,547	1,141,246	.....	169,022
Heifers over 1 year not calved	379,439	367,307	373,124	.....	6,315
Heifers under 1 year	609,115	612,098	638,840	29,725	.....
Total	2,298,822	2,260,952	2,153,210	Net	145,612

Milan, 27th November, 1916.

DEAR MR. RUDDICK.—In reply to your kind letter of September 11th, 1916. Since the beginning of the war, here in Italy, there is a decrease in the number of milch cows, but there is an increase in the number of calves which are bred to become milch cows.

I think that the war will not greatly affect the dairy industry in Italy, but it will affect the other countries in Europe, especially Germany and Austria-Hungary.

I thank you for the information you gave me concerning Canada. Here, too, the prices of dairy products are very high.

Please accept my best compliments,

PROF. C. GORINI.

Berne Dairy School, Rutti-Zollikofen,
Switzerland, Oct. 17, 1916.

DEAR MR. RUDDICK.—In reply to your letter of September 11th, I beg to give you the following information. In 1911 the total number of cattle in Switzerland was 1,443,371, including 796,533 cows. In 1916 the total number of cattle is 1,615,645, including 848,652 cows.

The above figures show that the Swiss people have gone in more for cattle breeding than dairying since the beginning of the war.

There has been a decrease in the quantity of milk received by cheese factories and milk condensing factories, owing to the fact that milk prices have been regulated by the authorities so as to help the food situation.

With respect to conditions in Germany and Austria-Hungary, I would say there has been a large decrease in the number of cattle of all kinds since 1914. This, it is claimed, is due to the shortage in wheat and fodder on account of poor crops. The following figures have just been published by the German Bureau of Statistics:

Year	Cattle
1907	20,630,544
April 13, 1916	19,922,183
Sept. 1, 1916	20,338,950

It is stated by the Bureau that the increase as recorded by the figures has been due to good crops of wheat and fodder in 1916. No cattle census has been published by Austria-Hungary. I do not think a census has been taken in that country since the beginning of the war. In 1915 the food situation was better than in Germany. Unless the war goes on indefinitely, I believe the European dairy industry will recover fairly rapidly from the setback which it has received from this terrible catastrophe. It has been clearly shown by this war that in periods of stress the best source of food supply for the people is a large number of cattle. For this reason all the Governments are endeavoring and will endeavor in the future to encourage cattle breeding and milk production. The development of these industries, however, may suffer from lack of help. Already good cattlemen are very scarce, and it is impossible to do without them.

Many thanks for the information that you have been kind enough to give me on the situation in Canada. I still remember the pleasant days I spent in your country in 1909.

Yours truly,

A. Peter.

The increase in cattle in Switzerland between 1911 and 1916 is 172,274, and an increase during the same period of 52,119 milch cows.

The figures for Germany show a decrease of 707,361 on April 13, 1916, as compared with 1907, but on the other hand there appears to have been an increase in the total of 416,761 cattle between April 13th and September 1st, 1916.

I want to say a word or two about the use of pepsin for cheese making. When the scarcity of rennet developed last spring, it seemed to be highly important to introduce some substitute. As all cheese makers know, pepsin had been used for making cheese many years ago, but under normal conditions its cost was double the cost of rennet, so that it never became a possibility in the manufacture of cheese. With the view of obtaining some substitute, the dairy division at Ottawa undertook to carry on some experiments at the Finch dairy station, as you have heard outlined by Mr. Barr.

Two or three things seemed to be necessary; first to get a substitute, and, second, to see that it was a standard article uniform in strength. No inferior grades were to be allowed to be exploited. Just as soon as it became known that pepsin could be used for this purpose there were a great many different brands of different strength put on the market. It was quite evident that there was danger of great confusion if it was not regulated in some way. We took the stand, whenever we were asked for information, that we would not help in any way, and we refused to give lists of cheese-makers to any person who had not submitted their product to the Department for trial before it was sent out. We took that stand, and we would not allow the use of anything that had not been tried. Some cheese-makers got into difficulty. I know of some cases where whole batches of milk were lost by the use of an article with which they were not acquainted. We have been so accustomed to a standard article of rennet that the cheese-maker is not equipped to determine, off-hand, whether the coagulant he is going to use is standard or not. I think it was well worth devoting a great deal of time, as we did, to this question. It was thought in May that there would be an actual shortage in supplies. I was authorized by the Minister to secure quite a large supply of pepsin to keep on hand to supply cheese-makers. In doing that I think we steadied the price of rennet and pepsin to some extent. We still have a supply

on hand. I do not think the cheese-maker need have any uneasiness as to the situation at present. There will be sufficient rennet to carry on the business for years to come. At one time there was some complaint as to this pepsin spoiling the reputation of our cheese. One of the staff went to Montreal and inspected the cheese in the warehouses there, and after examining the cheese he stated that he was unable to find anything that could not be explained from other reasons, and to show you how much there was in the complaint, the owner of a factory came across one of his own cheese which had the difficulty they were complaining of, and he said: "There never was a pound of pepsin in my factory." That cheese from his factory was one of the cheese they were complaining about. I had correspondence with the representative of the New Zealand Dairy Association in London. They were getting into trouble, and he wrote me and said: "Our friends say the cheese made from pepsin won't keep." I knew they could not have any information on the subject, and I wrote him and said we would be very glad to know on what he based his opinion, and he said he had no information whatever. Those of you who saw the cheese Mr. Barr cut up will not have any fear on that score, because these cheese were kept in the cool curing-room through the whole summer and had never been in cold storage.

GRADING PROBLEMS.

FRANK HERNS, LONDON.

The title of the subject that I have for this afternoon is rather indefinite, and perhaps I should make a little explanation in reference to the matter. We are very glad to have with us this afternoon Mr. C. Marker, Dairy Commissioner for the Province of Alberta. Had we known he was coming to Ontario at this time we would have had him on the programme. He came to Ontario on other business, and at the request of the directors remained over for our meeting, and I do not know of any person who can speak with more authority on this subject of grading than Mr. Marker. I also wish to say that following my paper, Mr. John H. Scott, who has been employed this year by the Dairy Branch, Ontario Dept. of Agriculture, in grading the butter at Toronto will give his experience. There are also present a number of the members of the Toronto Produce Exchange, and we will be very glad to hear a few words from them on this important subject. We also have with us this afternoon the Deputy Minister of Agriculture, Mr. Roadhouse, and Mr. Geo. A. Putnam, who had charge of Dairy Instruction for the Province. I am glad that these gentlemen are here, because we want to be sure of the financial end of the problem. Without the aid of men like Mr. Scott, I could not devote the necessary time to the problem. We must have someone at Toronto who understands the business, and who will have the confidence of the dealers, creamerymen and producers.

For a number of years it has been felt by many persons, closely connected with the creamery industry, that the time would come when Ontario dairymen may have to give more attention to this problem of payment for cream and butter by grade. The Dairy Branch of the Ontario Department of Agriculture has endeavored to point out, through educational methods and more recently by demonstration, some of the advantages of this method of payment. The farm press has also assisted in creating an interest along this special line.

Producers and creamery men who turn out first-grade cream and butter are no doubt entitled to a premium for superior quality, instead of marketing on the "flat-rate system," by which finest, indifferent and poor cream or butter are sold on the average market at approximately the same price.

The first grade cream and butter has to carry the inferior grades, which means, that the price for first grade must, under present marketing methods, be reduced, to allow for any loss on the second grade.

The recent increase in the number of Ontario creameries and in the output of butter (from six million pounds in 1907 to over twenty million pounds in 1915), the competition for cream and the introduction of the "cream shipping" and "cream buying station" system, has led to competitive methods which a few years ago were unknown.

Whether or not the introduction of these new methods of buying cream has affected the quality may be a debatable question. At any rate, in spite of the fact that there appears to be an increasing demand in the local markets for butter of finest quality, and also for the inferior grades, it must be recognized that the expansion of the creamery industry in Ontario, and in the other Provinces, will eventually produce a surplus of butter to enter into competition, either in the inter-provincial trade or in the export markets.

Referring especially to the past season, the Canadian butter market was, under war conditions, relieved of a large quantity of butter by heavy shipments abroad and prices reached a point far beyond expectations.

The scarcity created an advancing market and all grades of butter were readily picked up and disposed of, but after the close of the war, and normal conditions return, what may then be the situation?

The future cannot be predicted, but there are reasons for assuming that changed conditions will have to be met, and preparations made to place Ontario butter on any market, the quality of which butter will be equal to that produced not only in other Canadian competing provinces but in other countries as well.

After discussing this grading question from time to time for several years, and although it has been repeatedly stated that no grading plan could become acceptable under Ontario creamery conditions, it was still felt that at least an effort should be made to find out whether or not any plan could be worked out, that, although not expected at first to solve the whole grading question, yet if such a plan could be made of use to supplement our present creamery instruction methods, for the purpose of further improving quality, it should be "worth while." Moreover, if after a reasonable trial, it was found that a grading system could be established, such a plan would be still more "worth while."

Up to within a couple of years ago, it was pretty generally supposed that the Ontario butter dealers (following the line of least resistance, such as country storekeepers have followed for years in the purchase of dairy butter, that is, paying the same price for all grades), could not make any distinction in the price of creamery butter and meet competition. However, there is reason to believe that the more progressive dealers realize the importance of some method of marketing butter on a quality basis, and that they are ready to co-operate to the fullest extent with the creamery men and producers in order to make workable a system of this kind.

It has always seemed to me that before any system of cream grading will be accepted with any degree of enthusiasm by the average producer, it must be demonstrated that a higher price will be received for first grade butter; conse-

quently a beginning should be made at the selling end, if anything definite is to be accomplished.

Following out a suggestion which I made at the last Convention, the Director of Dairy Instruction authorized me to proceed to work out preliminary details suitable, so far as possible, for the beginning of a grading plan.

Early in April the Director and myself met (in Toronto) with a committee of prominent butter dealers for the purpose of discussing the whole question, and as a result certain grading standards were agreed upon and other arrangements made.

The late Minister of Agriculture, the late Hon. Mr. Duff, engaged Mr. John H. Scott as produce grader. Mr. Scott began his work about the first of July and will give you a report later.

Three points were especially in view:—

(1) Is it practical to examine, on arrival at the storages, any large number of lots of butter, score this butter according to standards agreed upon, and make a report regarding quality to the creameries interested?

(2) Is it practical under Ontario conditions to introduce a plan of grading butter by sample?

(3) Do the creamery men and dealers desire to have disputes on quality dealt with by the grader?

I wish at this point to express sincere appreciation of the courtesy shown us by the butter dealers of Toronto and other places, They assisted us in every way and heartily endorsed our efforts.

In order that closer relations between buyers and sellers may be brought about, I would suggest that creamery men take every opportunity to visit the warehouses and examine the butter they have shipped in. I feel sure they will find it of great educational value, and will realize more fully the advantages to them and to the trade in general in producing a uniform, first grade butter. They may see defects in their product, which, perhaps, escaped their notice at the creamery, and they will realize to a greater extent the importance of "quality" under all conditions.

After four months work in connection with the points mentioned above, and after discussing the matter with the creamery men at the recent District Meeting at Guelph, and with the owners of creameries and with the dealers, I may state that the Department hopes to continue this work and offers for this coming season to the creamery men who wish to co-operate with us a grading service, that is:—

(1) All the butter that can be reached in the warehouses will be scored and a confidential report sent to the shippers.

(2) We will grade by sample and send to the salesman the score of the butter from any creamery desiring to take advantage of the grading service, providing the proprietor will agree to conform to a few simple regulations.

(3) The grader will, when requested, referee disputes regarding quality between buyer and seller.

As yet this grading plan is only in the initial stage, but from the work so far done it appears practical to gradually introduce in Ontario a system of commercial grading which will have for its object, not only the ultimate improvement in quality, but in addition will insure so far as possible the creameries that turn out first grade butter obtaining a premium for it.

There is no desire to create unsettling radical changes or to advocate theoretical methods. The object of this work is to endeavor to eventually prove, so far as possible, by practical demonstration that a grading system is or is not workable

in Ontario. If this method proves successful it is believed to be in the best interests and to the advantage of the producer, creamery proprietor, dealer and consumer.

The process may be slow, but I feel that it is better to work slowly, but surely, and to make the merit of this plan the means of its general adoption, rather than to rush into radical changes before public opinion is prepared to support the movement. We ask you to withhold criticism until the method has had a fair trial and then to accept or reject it on its merits.

May we have the co-operation and support of those engaged in the creamery industry? We wish to point out that we can continue this work only as far as the money available and your support will allow.

Mr. Robinson: As a creamery man, I would like to say that I appreciate the good work the Department has done for us this year. In Ontario, cheese has been the big end of the industry, and naturally has received a great deal of attention. Creamery men have felt that they have been set to one side, but we hope to get on the main line at no distant date. I do not think any work will help us in getting on the main line more than this question of grading. I do not think we can grade cream unless we grade the butter. I do not wish to take up your time, but would ask this meeting to give its support to the following resolution:

"We, the dairymen, especially the creamery men, met in convention at Woodstock on the 10th and 11th January, 1917, wish to express our appreciation of the splendid efforts the Provincial Department of Agriculture is putting forth towards devising workable methods towards grading cream and butter. Our thanks are especially due to Messrs. Putnam, Herns and Scott, and we trust that with their able assistance this difficult problem will be satisfactorily solved in the near future."

I feel that these men are doing splendid work, and doing it under no small effort on their own part. It means a lot of time and thought on their part, and I would be glad as a creamery man to see this resolution have the hearty support of this convention.

Mr. Max Waddell: I believe we have the "Butter Ball" on the roll, and we want to keep it rolling every day, and do all we can to get the co-operation of every creamery man and farmer with the Department. I feel satisfied that Messrs. Roadhouse, Putnam, Herns, and Scott will give us every assistance, as they have in the past, and I have much pleasure in seconding the resolution.

The resolution was carried.

GRADING PROBLEMS.

John H. Scott, Toronto.

Early in July, I was asked by the Dairy Branch of the Department of Agriculture, through Mr. Herns, to go to Toronto and do some work in connection with butter grading, with the object in view of getting data and laying the foundation of a system by which creamery butter would be bought and sold on a quality basis.

All interested in Ontario's butter trade have been feeling anxious that our butter should take a high place in our Canadian markets as well as in the markets of the world. It is not pleasant to hear, which we quite frequently do, that the

quality of Ontario butter is not equal to that of some of our sister Provinces, and it has been felt that some change in our present system is necessary in order to raise the standard of quality.

I think all are agreed that the quality of butter depends, first of all, on the quality of the cream, so that any system of improvement must go back primarily to the producer. I quite frequently hear people say, "The farmer should be educated to produce a better quality of cream," and "Why don't you begin at the farmers' end of the business?" Intelligent farmers resent those statements, and they are justified, very often, in doing so.

The farmers are not producing cream with any other purpose in view than to make a profit, and I have found that they are always ready to make improvements in their methods when it was demonstrated to them, that each improvement would be profitable in dollars and cents to themselves; but I have seen them dismayed and discouraged when they saw their good, well-cared-for cream mixed with and paid for on the same basis as their neighbor's, who was utterly careless and indifferent about the quality. This system brings the best down to the average, and raises the poorest up to the average, a sort of Socialistic system which I do not believe to be very popular for the payment of cream, by the farmers who have made it possible for the quality of our butter to be as good as it has been.

One year ago the subject of cream grading was discussed quite fully. A great many difficulties appeared in the way. Some of them have been or will be removed, others can be removed by a united effort.

Our creamery instructors have done splendid work both in the creameries and amongst the farmers, but their work has always been handicapped by the one-price system for all qualities.

Lack of co-operation between creamery owners, between buyers, and they between each other, has been a hindrance to improvement. If a creamery rejects or pays a less price for poor quality it loses a patron. If a butter buyer rejects a shipment or cuts the price on quality he very often loses a customer because of lack of co-operation. The other fellow, whether it is the creamery or the butter buyer, is ready to "butt in."

I was asked by the Department to act as official referee in cases of dispute between buyer and seller. I did in a few cases, but where the decision went against the seller he simply asked the buyer to reship the goods to some storage to his account and expense, and as the market was advancing he got away with his poor butter at more money, and who could blame him?

The Department also asked me to make a confidential report on the quality of all the butter I could see coming into Toronto.

The dealers very kindly let me into their storages at all times. I made a confidential report on the butter I saw, sending a duplicate copy to Mr. Herns.

There were two objects in view, first that we might get a general idea of what percentage of first grade, second grade, etc., was coming in, and second, that by seeing the butter as it arrived on the market we might, through the travelling instructors, be able to reach the creameries and help the butter-makers to overcome influences that were affecting the quality.

We drafted a standard of grades which I have used, viz., 92 points and over 1st grade, with a minimum of 39 points for flavor, out of a possible 45; 87 points but under 92, second grade; 82 points and under 87, third grade; under 87, off grade or culls.

I examined 214 lots or shipments up till Oct. 31st.. I placed 123 lots or 57 per cent. first grade, 89 lots or 41 per cent. second grade, with less than 1 per

cent. 3rd grade, according to our standards. I am quite free to admit that I erred in scoring too high; that is, I should have placed more as third grade, but experience teaches.

During the first part of July, the butter that I saw was nearly all June make and was really fine butter. About the 25th of July the hot weather goods began to appear from that date until Sept. 25th, 54 per cent. of the butter seen scored less than 92 points. During the month of October 70 per cent. graded 1st grade. Showing that with good weather, when the cream will care for itself, No. 1 grade butter is generally produced.

Some creameries shipped through the hottest weather nothing but No. 1 grade butter, proving that under best management the good quality can be maintained through the worst weather.

Twenty-three per cent. of the butter seen showed not clean or dirty flavor of flavors that could not be designated, 32 per cent. showed old cream flavor or flavors that are easily recognized as caused by cream that has deteriorated, 16 per cent. stale flavor, or butter that has gone off or has become strong, 9 per cent. fish flavor.

The most common defects in body and texture were 13 per cent. weak, 11 per cent. greasy, 8 per cent. loose or open, and 9 per cent. excessive free moisture, usually a milky brine.

In color, 10 per cent. mottled, 11 per cent. uneven or not clear. In salt, 29 per cent. salted too heavy, 9 per cent. undissolved. It seems to be the practice with a good many butter-makers that when the flavor is not just right, they will try to cover it up with salt. This, I believe, is a serious mistake, and often results in making the bad flavor more pronounced; 69 per cent. of the butter showing "fishy" flavor was very heavily salted.

Sixty-two per cent. was poorly finished, that is uneven surface, wrinkled paper, presenting a general careless and untidy appearance; and while the trade might not object from a commercial standpoint, yet it is far below the best finish. Some creameries send in every box as if it had been finished in a planing machine. Twelve per cent. were very badly finished, showing that absolutely no attempt had been made to present a respectable appearance, 77 per cent. of this class of butter scored less than 23 for texture, indicating that the man that makes the poor finish usually does the whole job along the same line.

The system of marketing butter might be greatly improved, an organized system of co-operative marketing might be introduced with great benefit to the trade. I mean an official organization of buyers and sellers representing both ends of the trade with the object in view of paying for butter on a basis of quality.

The system of marketing butter at present is generally the following: The creamery sells to the dealer by telephone, or ships on consignment to regular commission merchants. The butter is bought as good marketable butter, and is supposed to be first quality, unless otherwise mentioned. It is usually shipped in Government refrigerator cars, during the hot months. On arriving at the storage it is inspected. The buyer governs his inspection a good deal by the market. If the market has advanced since he bought its defects will be lightly passed over. If the market has declined, quality will take a larger place from the buyer's viewpoint.

Most distributing houses have two or more grades or brands on which they sell to the retail trade. A certain brand denotes the quality it represents. It quite often occurs that the butter going into the first grade brand costs the dealer

less money than that going into the second grade brand, both purchased from the creameries at the same time.

Some dealers handle principally only creameries that they have learned to depend upon for No. 1 quality, and they pay a premium for that butter, and cannot get enough of it to supply the demand for the absolutely dependable quality which this select trade requires.

Now what are the conclusions?

First we do not believe that the butter market will continuously keep the upward incline, but that there will come a time when prices will recede to what we call normal or perhaps below.

The Western Provinces are now producing their own butter and have actually become exporters. Our surplus butter will have to find an export market, where it will come into competition with our sister provinces as well as the outside trade. Then we want to be ready to guarantee the quality of every car of butter that leaves our province to be as good as the grade that it represents.

We believe that the Dairy Standard Act would put the creameries on a more uniform basis for paying for cream by all using the Babcock test with a weighed sample, so that there will be a better understanding among the farmers of methods of paying which will help to remove suspicion, and will encourage them to assist more readily in improving the quality.

We believe that the dealers are ready to co-operate in this work of paying on a quality basis of grade, if supported in an honest endeavor by the creameries. Then if the creameries take up the question of grading cream they will overcome the practical difficulties that appear in the way. Then will the farmers, who are willing to produce the good cream get paid for their labor, expended in care and cleanliness, and then will Ontario butter take the place which it should take in the estimation of those coming in contact with it whether in Canada or elsewhere.

THE GRADING OF BUTTER.

C. Marker, Dairy Commissioner, Edmonton, Alberta.

I am personally under obligation to the Dairymen of Ontario. One of the speakers at one of your meetings said "If all had been as good as the best," in speaking of your dairy products, then the revenue would have been so and so many thousands of dollars more than it was. That phrase struck me as being peculiarly apt in the dairy business. "If all had been as good as the best." That is really what brings us together year after year, and that is the object that has brought your Association together at this time. For fifty years the problem has been, how to make all as good as the best. I want to hand back to you that message, and assure you that we have made good use of it in the West. We took that message to the farmers with our short course work. May I congratulate you, Mr. President and officers of the Department of Agriculture for the Province of Ontario, upon the step which you are about to take. I have been fortunate to watch the development of that work in the Province of Alberta, and I can assure you that if you would all agree to set to work and solve that problem you will surely succeed. Some men look upon this grading scheme as a mass of difficulties. I do not think that is the right point of view, and I am sure that is not the point of view taken by the gentlemen who have just spoken to you and by the Department of Agricul-

ture for Ontario. With us the problem was a real one, and was this: How are we going to secure a market for the surplus dairy products of the Province of Alberta? That question can be taken back to the farm. The farmer's surplus is taken to the factory. So far as the creamery is concerned, practically the whole output is surplus, so that it concerns the farmer, and it certainly concerns the trade—the men who provide facilities for storing, who invest their money in holding this product against a shortage. Ontario butter coming into our market was the first thing to remind us that we had to make some improvement. Of course we could handle our butter at a price, but for the best trade we must have some of this good Ontario butter. That was a few years ago. Then a little later on it was Eastern Townships butter that came into the Western market. One year there was a shortage of butter in the east, and a small shipment of New Zealand butter was brought in. That small shipment of New Zealand butter made such an impression, particularly with regard to its uniform quality and its good keeping quality, that they said: "Now, here is something that it is safe to handle. We can put that up to our best trade with the feeling that they will come back and ask for more." You will all agree with me when I say that was a very real problem for the dairymen of Alberta to come up against. The logical thing to do was to find out what the market really wanted. The consumer is always looked after, he has a well organized staff in commercial men who are well equipped. That is the function of trade to look after the consumer.

It was my privilege to address this Convention a few years ago on cream grading, so that I will not refer to that, but I would like briefly to sketch a plan that has been worked out in Alberta. This plan is shown on this chart, which was prepared to take out with the Department's demonstration train last year. We wanted to show the farmer how the dairy industry was linked up with the trade. The retailer keeps exactly what the consumer wants, and the consumer knows where to go to get what he wants. Prior to the grading system, the wholesaler bought from the creamery on the flat rate and did his own grading. The Department had been marketing for a number of creameries for sometime, and was in close touch with the trade. The Department being anxious to encourage in every way the development of the dairy industry drew up a plan for the commercial grading of butter for creameries that wanted to do their own marketing. This plan was laid before the trade of the west. The Department said: "We are prepared to grade butter for any creamery in the Province and issue grade certificates, and if you want to buy on that basis from the creameries you only have to require the creameries to furnish the certificates. When the wholesale men of Alberta and British Columbia found that this grading principle would be at the disposal of the creameries, they said: "We will see to it that the creameries that make the best butter will get the best price." The grading has been in operation now in a fairly large way for two years, and it is really remarkable the improvement that has been brought about in a short time. The creamery operator who wants to have his output in the highest grade must have high grade cream. In that way the preference is passed back to the farmer. The farmer is interested in not only selling his cream to the creamery, but he is interested in knowing that it is going to find its way to a satisfied customer.

Now that this question is brought before you by Mr. Herns and Mr. Scott, I will not take up your time further on it. I want to pay a very high tribute to our wholesale men in the West who made it possible to raise the average quality and value of the Alberta creamery butter in two years to a degree that we certainly did not dream of before this work was undertaken.

In our grade standards we have Special, First Grade, Second Grade, and Off grade. When the work was started we had First, Second and Off grade. Special is a grade that has been evolved through the application of the grading of cream and butter. We have built up a new grade of cream, which is now taken by the Vancouver trade. When I say the Vancouver trade, I mean the best trade in that city. When I was there last August I said to one of the dealers, "Is there much New Zealand butter coming into this market?" The answer was "No." I said, "Are you missing it?" and he said "No, your Alberta butter is giving satisfaction to the trade that has been trained to use some of the finest butter manufactured in the world—the New Zealand butter."

That is what the dairymen of Alberta have been able to accomplish by co-operation all along the line. It is something that they have reason to be proud of, it is something that gives them assurance for the future. They feel that they are not entirely dependent on their home market. Fifteen years ago when we made less than a million pounds of butter in a year, people were talking of over-production. Last year the output of creamery butter was over eight and a half million pounds, and there were markets available for much more than that. This gives the farmers a feeling of security. They feel that they can safely go to work and take the advice that is given them on cow-testing work. They feel that they will be justified in improving their herds and extending their business, knowing they will always have a good and a growing market. In 1915 the percentage of specials was 59.68. In 1916 the percentage of specials was 79.25, a gain of 20 per cent. In 1915 the percentage of firsts was 52, and in 1916 it was 16.62. That means that half of the firsts in 1915 were raised into specials in 1916. Seconds in 1915 were 7.34, and in 1916 were 4.01. Off grades, that is the lowest grade, in 1915 were .94, and in 1916 were .12. Taking seconds and off grades for 1916 they were less than 4½ per cent. That just covers the creameries marketing through the Department. Seven of the largest creameries in the Province were doing their own marketing. In 1915 we graded over four thousand churnings for these creameries. The percentage of specials was 28.04. In 1916 the percentage of specials was 14.7. No special grade certificate was issued on any butter that had not been made from properly pasteurized cream. One point which I think deserves attention is that while we live under these normal conditions, the time is coming when there will be a readjustment, and as good business men we should get ready for that time. The reason that we have been able to accomplish so much is that there has been co-operation all along the line.

BUTTER GRADING.

Mr. H. B. Clemes, Secretary of the Toronto Produce Exchange, gave an address on Butter Grading and pointed out that the members of the Exchange were unanimously in favor of grading all butter sold in Ontario. Mr. Clemes read the following resolution which had been adopted by the members of the Toronto Produce Exchange: "Resolved, that owing to the conditions as outlined in the attached letter of this Exchange, we believe it imperative in the best interest of Ontario Creamery Butter, that a proper system of grading be adopted at the earliest possible moment, and we, the undersigned, pledge ourselves to buy creamery butter in accordance with this proposed system as soon as it is adopted and on no other basis. We hope that arrangements can be made by the Depart-

ment of Agriculture to put such a system in operation so that all butter manufactured will be properly graded by competent judges, and Government certificates issued accordingly before the new season of production has begun."

At the completion of Mr. Clemes' address, many dairymen present discussed at some length the merits of grading.

REPORT OF COMMITTEE ON RESOLUTIONS, 1917.

1. Resolved, that we, the members of this Association desire to express our appreciation of the hearty reception given the members and delegates by the citizens of the City of Woodstock. We also desire to thank the Mayor and Council for their kindness in furnishing the free use of the City Hall for the Convention and the Market Building for the Dairy Exhibition.

2. We desire to express our appreciation of the addresses given by the various speakers which have contributed to the success and educational value of the Convention and we extend to them our sincere thanks for their assistance.

3. That the thanks of the members of this Association are hereby tendered to the Canadian Salt Co., Windsor, through their general manager, Mr. E. G. Henderson, for the very handsome badges presented by their company to this Association.

4. We wish to thank the press for the excellent reports published by them of this Convention and express our appreciation of their assistance.

5. That the thanks of this Association are hereby tendered to the Heller & Merz Co., New York; C. Richardson & Co., St. Mary's; The R. M. Ballantyne Co., Ltd., Stratford; C. H. Slawson & Co., Ingersoll; D. H. Burrill & Co., Little Falls, N.Y.; The J. B. Ford Co., Wyandotte, Mich.; The Canadian Salt Co., Windsor, Ont.; The Western Salt Co., Courtright, Ont.; The De Laval Dairy Supply Co., Peterboro; W. A. Drummond & Co., Toronto; The Imperial Bank of Canada; Ryrie Bros., Toronto; for the special prizes donated and we especially wish to thank the members of the Toronto Produce Exchange for the very handsome shield donated for our Dairy Exhibition.

6. That, as dairymen, we are under great obligations to both the Provincial and Federal Departments of Agriculture for assistance rendered the dairy industry and we wish to tender our sincere thanks and express our appreciation of the work done by these Agricultural Departments in promoting the agricultural interests of the Province and the Dominion.

7. That the members of this Association desire to express their sincere regret at the deaths of the late Hon. Jas. Duff, Minister of Agriculture for Ontario, Dr. C. C. James, Agricultural Commissioner for Canada, and the Hon. Senator D. Derbyshire, for many years President of the Dairymen's Association of Eastern Ontario. We fully realize in the death of these men Canadian dairymen have sustained a loss which can never be replaced.

8. That this Association is in sympathy with the plan outlined by the officials of the Dairy Branch of the Ontario Department of Agriculture, to stimulate and encourage a grading system for creamery products; also the support of this organization may be counted upon to encourage the methods which may be adopted from time to time by the Agricultural Department to successfully put into operation the new Dairy Standards Act. That this Association appreciates the efforts of the Ontario Government to benefit the dairy interest through the operation of this legislation.

9. That this Association believes it would be in the best interests for the successful operation of the Dairy Standards Act, if a clause was incorporated in the Act dealing with the payment by test of all milk sold wholesale for any purpose and respectfully suggest that an amendment to the Act be made which will include this provision.

10. That this Association believes it to be in the best interests of both consumer and producer of dairy products to maintain the present restrictions against the manufacture and sale of oleomargarine in Canada and respectfully petition the Federal Minister of Agriculture to continue through the Federal Government these restrictions.

11. That this Association desires to place on record appreciation of the good service rendered by the Dominion Dairy Station at Finch, Ont., and of the Dairy School of the Ontario Agricultural College, Guelph, in connection with the introduction of the use of pepsin as a substitute for rennet in the manufacture of cheese.

The report as read was adopted.

FIFTY YEARS OF PROGRESS.

Western Ontario.

In 1864 there was one cheese factory near Norwich, in Oxford County, and in 1875 one creamery at Teeswater, in Bruce County, in Western Ontario.

In 1915 over 44,000 Western Ontario farmers furnished the milk and cream to 150 cheese factories and 125 creameries to produce 32,000,000 pounds of cheese and 21,000,000 pounds of creamery butter.

The value of this cheese and butter was nearly $11,000,000. About 100,000,000 pounds of milk is sold yearly by additional producers to the two milk powder factories and six milk condensers, the value of which, including milk and cream sold as such, is over $3,000,000. To this amount must be added the value of the dairy butter produced on the farms, the milk and cream furnished to towns and cities for direct consumption, for ice cream and other purposes.

Average of Yearly Prices, Ten Year Periods.

Years	Per lb. of Cheese	Per 100 lbs. Cheese Milk (Gross Value)	Per lb. of Butter
1884–1893	$0.0963	$0.89	† $0.1782
1894–1903	0.0891	0.82	† 0.1952
1904–1913	0.1156	1.05	† 0.2058
1914	0.125	1.13	x 0.2639
1915	0.155	1.41	x 0.2865
*1916	0.18	1.63	x 0.33

* Estimated. † For Export. x Local Trade.

In 1866 a few leading dairymen held a meeting at the Maple Leaf Cheese Factory near Ingersoll, Ont. (this factory ceased operations in 1913) when the first Dairymen's Association was formed. The organization was completed at a Convention held in the Town Hall, Ingersoll, July 31st, 1867, and was known as the Canadian Dairymen's Association.

In 1877 the name was changed to the Dairymen's Association of Western Ontario. In 1896 the name was changed to the Cheese and Butter Association

of Western Ontario, remaining under this title until 1900, when the name was again changed to the Dairymen's Association of Western Ontario.

In 1869 on the recommendation of the Dairymen's Association, the first Provincial Dairy Act was passed, dealing with legislation controlling milk sanitation and frauds in connection with the adulteration of milk.

Dairy exhibitions were held first about 1871. In 1900 the Dairy Exhibition became a permanent feature of the Annual Convention.

The first attempt at factory instruction in Canada was made in 1879.

In 1888 the Dairymen's Association of Western Ontario again sent out instructors, the number employed varied from year to year, and in 1902 there were four instructors in the employ of the Association.

The Provincial Government made in 1902 a beginning towards what resulted eventually in systematic control of dairy instruction and inspection.

In 1903 the factories were divided into groups with an instructor over each group. There are now five cheese and three creamery instructors for Western Ontario under a chief instructor who also performs the duties of Secretary-Treasurer for the Dairymen's Association.

In 1907 the Provincial Government assumed full responsibility for dairy instruction work, creating a dairy branch under a director. Through legislation the instructors were given certain powers as sanitary inspectors. Cheese factories, creameries and other dairy plants, including milk and cream buying stations, are registered with the Department of Agriculture and must comply with certain sanitary regulations. Similar regulations apply to all new or other buildings opened for the manufacture of dairy products. Cheese and buttermakers and operators of milk and cream buying stations must hold certificates from the Department of Agriculture.

In 1916 a further step was taken by the Provincial Dairy Branch in conjunction with the Dairymen's Association in inaugurating a system of cream and butter grading which is now in the initial stage.

Federal legislation provides for (*a*) the proper branding of, (*b*) the prevention of frauds in the production, manufacture and sale of dairy products. Oleomargarine and other butter substitutes are not allowed in Canada. The Dairymen's Association always has been an active force in the progress and improvement of the dairying industry, including the establishment of dairy schools, dairy instruction and inspection methods, giving council in dairy legislation, improving the milk and cream supply, and in the turning out of more uniform, high class dairy products of a standard quality.

Since organization, thirty Presidents and nine Secretaries are recorded. Many able men, closely identified with the dairy industry, have served on the Boards of Directors. Others equally deserving of mention, have performed the duties allotted to them as members. Dairymen of to-day owe a debt of gratitude to the energetic men and women of both Eastern and Western Ontario, who assisted in building up this great National Dairy Industry. A number of these men and women have passed away but the results of their work still lives.

The rapid progress of the dairy industry during the past fifty years could only have been brought about by the united efforts of all engaged in the industry and with the assistance of sympathetic Governments.

The next fifty years will see yet greater progress. Many scientific facts relating to the fundamental principles governing dairy production and the manufacture of dairy products have only recently been discovered. There are many things still unknown, difficult problems yet to be solved. These problems will

eventually be successfully dealt with. Through the application of science and practice, crude and uncertain methods have gradually been replaced by more improved systems. The standards of production are upward; prices are advancing. There is yet much to learn and many things to do before the ideals of the founders of this organization are reached.

This world war is creating unforseen problems. Let there be closer co-operation among the various dairy interests and may the watch word of the future be as in the past "Quality."

PRESIDENTS AND SECRETARIES OF THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO SINCE ORGANIZATION.

The late C. E. Chadwick, Ingersoll, Ont.
Pres., 1869-1870; Sec., 1876-1891.
The late Jas. Noxon, Ingersoll, Ont.
President, 1871; Secretary, 1869.
The late Hon. Thos. Ballantyne, M.P.P., Stratford, Ont.
President, 1872, 1873, 1879, 1882, 1883, 1885, 1886, 1887, 1891.
The late K. Graham, Belleville, Ont.
President, 1874.
The late E. Caswell, Ingersoll, Ont.
President, 1875, 1880, 1881, 1888.
The late P. R. Daly, Belleville, Ont.
President, 1876.
The late Benj. Hopkins, Brownsville, Ont.
President, 1877, 1878.
The late L. R. Richardson, Strathroy, Ont.
President, 1884.
The late Robt. Cleland, Listowel, Ont.
President, 1889.
The late J. B. Lane, Dorchester, Ont.
President, 1890.
Jno. Geary, London, Ont.
President, 1892, 1893.
The late Andrew Patullo, M.P.P., Woodstock, Ont.
President, 1894, 1895.
A. F. MacLaren, M.P., Toronto, Ont.
President, 1896, 1897.
The late Harold Eagle, Brantford, Ont.
President, 1898, 1899.
R. M. Ballantyne, Montreal, Que.
President, 1900, 1901.
Aaron Wenger, Ayton, Ont.
President, 1902.
Jas. Connolly, Goderich, Ont.
President, 1903.
J. N. Paget, Canboro, Ont.
President, 1904.
Robt. Johnston, Woodstock, Ont.
President, 1905.
Thos. Ballantyne, Jr., Stratford, Ont.
President, 1906.
Jno. McQuaker, Owen Sound, Ont.
President, 1907.
Jno. Brodie, Mapleton, Ont.
President, 1908.
J. J. Parsons, Jarvis, Ont.
President, 1909.
Jno. H. Scott, Exeter, Ont.
President, 1910.
Wm. Waddell, Kerwood, Ont.
President, 1911.
D. A. Dempsey, Stratford, Ont.
President, 1912.
S. E. Facey, Harrietsville, Ont.
President, 1913.
J. B. Muir, Ingersoll, Ont.
President, 1914.
Robt. Myrick, Springford, Ont.
President, 1915.
Jas. Bristow, St. Thomas, Ont.
President, 1916.
The late R. A. Janes, Ingersoll, Ont.
Secretary, 1870, 1871.
J. H. Bell, K.C., M.P.P., Charlottetown, P.EI.
Secretary, 1871-1872.
Lieut.-Col. J. C. Hegler, K.C., Ingersoll, Ont.
Sec., 1873-1885; Sec.-Treas., 1885-1891.
J. W. Wheaton, Toronto, Ont.
Secretary-Treasurer, 1892-1896.
Geo. Hately, Brantford, Ont.
Secretary-Treasurer, 1897-1903.
Geo. H. Barr, Ottawa, Ont.
Secretary-Treasurer, 1904-1906.
F. Herns, London, Ont.
Secretary-Treasurer, 1907-1916.

DAIRY SCHOOL, ONTARIO AGRICULTURAL COLLEGE, REPORT FOR 1917.

STAFF OF LECTURERS AND INSTRUCTORS.

H. H. DEAN, B.S.A.	Professor of Dairy Husbandry.
R. HARCOURT, B.S.A.	Professor of Dairy Chemistry.
A. L. GIBSON, B.S.A.	Lecturer in Dairy Chemistry.
D. H. JONES, B.S.A.	Professor of Dairy Bacteriology.
R. FINKLESTEIN	Lecturer in Dairy Bacteriology.
T. J. MCKINNEY	Instructor in Cheese Making.
G. TRAVIS	Instructor Hand and Power Cream Separators; also in Boiler, Engine, Piping, Soldering, etc.
D. MCMILLAN	Instructor in Butter Making and Ice Cream Making.
R. J. SKELTON, B.S.A.	Instructor in Milk and Cream Testing.
MISS BELLE MILLAR	Instructress in Farm Butter Making and Farm Dairy, Soft and Fancy Cheese Making.
J. B. SMITH	Instructor in Hand Separators and Milk Testing, Farm Dairy.

The total attendance for all classes during the year was eighty-four. The number registered by Courses was:

Regular three months' course	35
Cow-Testing	27
Ice Cream and Soft Cheese Making	13
Instructors	8
Summer Course (not including Teachers)	1
Total	84

The number of students, like that in nearly all colleges, was somewhat lessened, owing to heavy drafts on cheese and butter makers, as well as from farm dairymen, for the war. A number of students and one Instructor, R. J. Skelton, B.S.A., of the 1917 classes have enlisted.

Interest throughout the course was good. The lectures and practical work were along lines similar to those carried out in former years.

If the war concludes before the term of 1918 closes, it is the intention to hold a re-union of all instructors and students of the Ontario Agricultural College Dairy School, some time in March, 1918. This will celebrate twenty-five years of successful dairy courses. We hope that all those who have been associated with the School during the past quarter of a century will make it a point to be present, so far as possible. During the years of the School, about 2,000 students have registered for the various courses. We shall be glad to see them at Guelph next winter. A letter will be sent to all those whose addresses are known to us. If any instructor or ex-student reads this, we shall be glad to have him send us his address, so we may get in communication with him.

The chief change in the courses for 1918 will be a shortening of the Farm Dairy Course to one of four weeks, instead of twelve weeks. This Course will follow immediately after the one in Live Stock and Seed Judging at the College. Owing to the great scarcity of labor on dairy farms, it is thought advisable to make this change until the labor situation improves on Ontario farms.

H. H. DEAN.

EASTERN DAIRY SCHOOL, KINGSTON, 1917.

OFFICERS AND STAFF.

Director.—Geo. A. Putnam, B.S.A., Toronto.
Superintendent.—L. A. Zufelt, Kingston.

Staff of Lecturers and Instructors.

L. A. Zufelt	Dairy Lectures.
W. T. Connell, M.D.	Professor of Dairy Bacteriology.
W. O. Walker, M.A.	Professor of Dairy Chemistry.
J. H. Echlin	Instructor in Cheese Making.
W. G. Gardiner	Assistant in Cheese Making.
R. E. Elliott	Instructor in Butter Making.
Chas. Linn	Assistant in Butter Making.
J. Burd	Instructor in Separators.
Geo. H. Barker	Instructor in Milk Testing.

The total registration of students at the Dairy School for 1917 was 56, which compares very favorably with previous years and considering the unusual conditions prevailing at the present time is very gratifying indeed. Of this number 26 wrote on the final examinations for diplomas, all but one being successful.

The usual course of instruction was followed, embracing General Dairying, Milk-testing, Dairy Chemistry, Dairy Bacteriology, Cheese and Butter Making and various kindred subjects.

An adequate supply of milk and cream was provided for practical demonstrations.

Considerable work was also done during the School term in connection with trying out various substitutes for rennet which are being placed on the market, and whilst the work was hardly exhaustive enough to warrant definite conclusions, yet sufficient knowledge was obtained to justify us in warning the cheese makers to be very cautious about purchasing these liquid preparations, and deal only with reliable and responsible firms who can give a reliable guarantee as to quality. The only safe substitute for rennet which we can recommend is the dry pepsin in the scale, powdered, or spongy form.

The objection which the average maker has against the use of these dry forms of pepsin may easily be overcome by dissolving ½ lb. or 1 lb. in ten times its weight of water, the water being first boiled and then cooled to 90 degrees before being used. Dissolve the pepsin in one-half the quantity of water to be used. In the balance of the water dissolve the same weight of salt as pepsin, then mix the two together and cool as low as possible and keep in a cool place. If desirable 1 per cent. of boric acid may be added, or 1 ounce per gallon. This solution of pepsin may be used at the rate of 3½ to 4 ounces per 1,000 lbs. of milk. The time of cutting the vat is usually three times the first coagulation.

Some forms of pepsin show a whitish precipitation on the addition of dry salt to the solution. This is overcome by dissolving the salt in part of the water used and then mixing as above directed. This gives a beautiful clear liquid.

Never make up more than 1 lb. of pepsin at one time, unless this quantity will be used up within a week.

Eastern Dairy School Creamery.

Total butter for year ending December 31st, 1916	102,672 lbs.
Total receipts for sale of butter and cream	$35,956.10
Average selling price per lb. of butter	34.6c.
Average price paid patrons per lb. of fat	39.36c.

In accordance with the decision of our patrons to have their cream paid for on the quality basis, two grades of cream were established, viz., 1st grade, defined as sweet and clean in flavor, and 2nd grade, defined as cream which could not be classed as 1st. A difference of 2c. per lb. of fat was fixed between the two grades.

Of the total 266,724 lbs. of cream received only 10,963 lbs. was placed as second grade, or about 4 per cent. of the total. As about 15 per cent. of our total cream supply is received by express the above results speak volumes for the excellent care bestowed on the cream by our patrons. This also explains why Eastern Dairy School butter commands anywhere from 2 to 4c. per lb. over ordinary market prices.

Our patrons are well satisfied with the results of cream grading and have decided to continue this rule indefinitely.

Quality Basis for Payment of Cheese Milk.

During the month of September a series of experiments were conducted at the School to determine the relative values of various milks having different percentages of fat and casein. The results obtained in previous years were confirmed.

For the purpose of this work 100 lbs. of milk were purchased from various dairy farmers, within a radius of five or six miles of the School. The cheese were under the direct supervision of Mr. Publow, Chief Dairy Instructor for Eastern Ontario.

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